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THE BUILDER

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The New War Office.....The Late Mr. W. Young, F.R.I.B.A., and Mr. Clyde Young, A.R.I.B.A., Architects.
Sculpture at the New War Office.....Mr. Alfred Drury, A.R.A., Sculptor.
1. "The Horrors of War": "The Dignity of War."
2. "Victory": "Fame."
3. "The Fatherless and Widow": "The Winged Messenger of Peace."
The New Hotel de Ville, Versailles.....M. Le Grand, Architect.
1. The Principal Front.
2. The Interior Courtyard.
The Riccardi Palace, Florence
Part of Façade, Siena Cathedral
Piccolomini Altar, Siena Cathedral } .....Drawn by Mr. A. C. Conrade.
Church of SS. Sergius and Bacchus:—
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English Gothic Architecture.

BY a curious but not unnatural inversion of the right order of things, the practice of Gothic architecture in this country as a revived style has preceded the adequate study and comprehension of this great and splendid phase of the art. It is not easy to say whether the earlier text-books, such as Rickman's, were more the cause or the consequence of the newly-awakened appreciation which led to the Gothic revival in this country. But it is quite certain that neither that work nor its immediate successors really went to the root of Gothic architecture. They tabulated external features, they created a nomenclature, and they formed a chronological system correct in its main outlines, but too precise and symmetrical in its conventional divisions to square with the living facts. Upon these bases, however, the revival arose and has run its course; and now that the practice of "modern Gothic" has died out except in its partial employment for churches—for even from that ecclesiastical stronghold it is getting daily unseated, we are beginning at last to rightly study and understand the meaning of that which, in regard to imitation of its forms at least, we are abandoning. And the position is emphasised by the publication, at this eleventh hour, of what may fairly be called the fullest and most complete illustrated treatise on the subject which has yet appeared,* the work not of an architect but of an amateur, who, with an educated comprehension of architecture, has for several years devoted to the study and illustration of his subject an amount of time and labour which no architect in practice could have spared for such an object.

Even if it were accepted that the practice of revived Gothic was to be abandoned and was a thing of the past,

* "Gothic Architecture in England"; an analysis of the origin and development of English Church architecture from the Norman Conquest to the Dissolution of the Monasteries. By Francis Bond, M.A., Lincoln College, Oxford; Hon. Associate R.I.B.A. London: B. T. Batsford. 1905.

the study of the subject is of equal interest, even from a national point of view. As Mr. Bond truly says in his Introduction, "Of all the artistic achievements of the English race, two make unchallenged claim to pre-eminence: our imaginative literature and our mediæval architecture." And when we consider that nearly all French writers on mediæval architecture are ignorant of or indifferent to English architecture, and that American writers on the subject chiefly refer to English Gothic to belittle it and to represent French as the only Gothic worth attention, a work dealing fully and ably with our national architecture, by an author who has given proofs also of his extensive acquaintance with Continental Gothic, is the more to be welcomed.

Mr. Bond professes that his book is an attempt "not to classify, but to work out processes of development," to treat the subject by an evolutionary method. "English mediæval architecture has been presented too often as a sort of architectural Melchizedek, or as if it had sprung forth full-grown like some Pallas from the teeming head of Zeus, in the last half of the XIth century, in Caen or Canterbury. But the Norman offshoot of the great Romanesque stock had its roots in a distant past. Its history goes back to the earliest days of church building in newly Christianised Rome, to the first years of the IVth century. . . . Throughout the book, therefore, reference has been made, where reasonable evidence exists, to the origin and history of mediæval architecture not only in our own country but throughout Gaul, Germany, and Italy in the Dark Ages." And so the author proceeds to an analysis as to what is Gothic. It is not necessarily pointed arches (as we have all come to see now). After mentioning various definitions into which we have not space to go, he ends by coming pretty nearly to the definition that it is the architecture of the buttress. In regard to its most complete forms it might be said to be architecture of the vault and buttress, which however would exclude some buildings, not vaulted, that are unquestionably Gothic. The universal element in Gothic is after all the buttress. But it may be replied that the buttress, although found in connexion with timber-roofed buildings, was first developed from the necessity for resisting the thrust of the vault at certain points; the vault is the *causa causans*; and even some of the existing unvaulted buildings were obviously intended to have been vaulted had not either the courage or the purse of the builders failed them. Mr. Bond goes on to point out that Anglo-Norman Romanesque represents a class of buildings which have or may have vaulted roofs, but in which the thrust of the vaults is stopped by general thickness of walls, not by buttresses. This affords a good distinction between Romanesque and Gothic, though even here, as the author implies, the line cannot be drawn exactly; the elements of Romanesque melt almost insensibly into those of Gothic. But the suggestion he makes as to the importance of the buttress as the distinctive element in Gothic is a good one. That dividing up of the walls into separate masses placed at right angles to the axis of the building is the most essential structural distinction from the classic structure which treats the wall as a single mass parallel with the axis of the building. It is a process of resisting outward thrust instead of supporting vertical weight; and the treatment of the wall so as to express this function is of the essence of Gothic design. As long as the thickening of the wall at the required point retains the vertical lines and more or less of the suggestion of the pilaster, the character remains Romanesque; as soon as it is designed so as to express the function of leaning inward against an outward thrust, the true Gothic character is developed.

The plan adopted by the author for dealing with the whole complicated subject has been to divide his book into two main parts, of which the first, after the Introduction and a chapter on Definitions of Basilican Byzantine Romanesque and Gothic architecture, consists of a summary of the characteristics of English Romanesque and Gothic architecture according to chronological periods, which are divided thus:—1050—*c.* 1200; *c.* 1170—*c.* 1538; *c.* 1170—*c.* 1350; *c.* 1330—*c.* 1538; adding a chapter on "Chronological History of the Greater English Churches." The second and by far the largest part of the book is occupied with an analysis of the mediæval church architecture of England, in which separate elements—plan, supports, arches, vaulting, capitals, window-tracery, etc., etc., are each considered separately and in detail. The arrangement is a good one; we consider the subject first in its general aspect, secondly in its details. The last chapter of the Second Part consists of one of the most valuable items in the book, viz., a large selection of Gothic mouldings grouped in regard to the several portions of the building, in each of which the characteristic mouldings are arranged in chronological order, and (which is a very important merit) all are drawn to the same scale.

In considering the contents of so large a book (707 pages, besides the excellent and copious indexes), one can only undertake to deal with some special points, more particularly those in regard to which any special or new suggestion is made.

One point to which the author draws attention in the general summary is the great size of many of the early Norman churches of England, far surpassing the very largest of the mother country Normandy, and rarely equalled in the later days of complete Gothic architecture. The width of the Norman churches, he observes, was conditioned only by the length of the tie-beams by which they were spanned; but in remarking that this average width was not exceeded when stone vaulting was introduced, one may observe that it was not likely that it would be. It must have been felt, in those days of simple engineering science, that the vaulting of a roof with stone was a more difficult and risky undertaking than putting on a timber roof, which (in the form used in the Norman period) exercised little or no thrust on the walls; and the existence of churches in which the aisles are vaulted in stone and the nave roofed with timber is an additional proof of this. If they had felt equal to facing the problem of vaults of 50 ft. span or upwards it would probably have been done; but at York, which is 45 ft., only a wooden groining was ventured on. But the fact of the great comparative scale of the Anglo-Norman churches has been rather overlooked, and is significant. May we not say that it was one of the indirect architectural results of the Conquest; a great military success nearly always leads to a greater expansion and boldness in architectural development, and more particularly when the conquerors left a province to gain a kingdom. Architecture also was to be carried out in the new kingdom on a scale worthy of the event. A remark on the same page however we must take exception to. After observing that, once the plan settled—mainly by considerations of ritual—the first object was to consider the roofing, the author goes on—"and a secondary object, insisted upon with astonishing persistence in the middle ages, was that the church, if large, should be fire-proofed by building beneath the roof a stone ceiling or vault." Surely this is putting the cart before the horse. We should rather say that the stone vault was the essential thing, and the timber roof over it a protection from the weather; and surely we may ascribe the preference for stone vaults to something higher than the merely utilitarian motive of fire-proofing. Is it to be supposed that the mediæval architects had no perception of the superior monumental effect of a building roofed with the same solid material as the walls? Men who could imagine and carry out such buildings were surely not devoid of that degree of æsthetic perception. In the course of his interesting and useful summary of the practical conditions of mediæval building the author is probably right in his suggestion that the very inefficient foundations often found—and which wreaked vengeance upon the builders—were not so much the result of ignorance or indifference as of economy, as we occasionally find very great care taken in the provision of adequate foundations. In some cases we may imagine that it was not merely economy of labour but of time; in the case of Peterborough front, for instance, there is every reason to imagine that the grand design was run up in a hurry to cut out Ely. Mr. Bond notes, too, the serious consequences sometimes resulting from the thrust of the aisle vault both against the outer wall and the arcade. It has been noted, he observes, by Sir Christopher Wren (he does not cite the passage) "that the pier arcade has not infrequently received a considerable inclination *inwards*, owing to the thrust of the aisle vault"; a distortion which the commonsense of Wren attributed to its true origin and not to what doctrinaire theorists call a "refinement." In regard to the theory that the sections of Gothic churches were proportioned according to the ratio of the sides of some adopted triangle, Mr. Bond is (like ourselves) entirely sceptical; as he says, "no two of these theories agree, nor are they based on uniform systems of measurement." In

regard however to the effect of the relation between breadth and height, he draws attention to an important point; that the width of the bays in comparison with their height has something to do with it, as well as the width of the cross section of the church. In the naves of Lichfield and Wells the height is only twice the span, yet they do not look low, as do the naves of Exeter and Lincoln, the section of which is about in the same proportion. The explanation suggested is that in the former cases the bays are narrower in proportion, and consequently impart an appearance of height to the whole. The mere incident of the vaulting shaft springing from the floor, or only from a corbel above the springing of the arcade, has also a considerable influence on apparent height, the former arrangement emphasising the vertical line.

Under the head of "abutment" Mr. Bond distinguishes five different systems for the abutment to the nave vault: (1) flying buttresses concealed beneath the aisle roof; (2) flying buttresses just showing above the triforium roof, no part of the architectural effect, but merely a constructive expedient; (3) similar merely constructional flying buttresses, as at Boxgrove, showing visibly in the air, but with a second similar buttress just beneath the triforium roof; here we have the double flying buttress in existence, but not forming a visible factor in the architectural design; (4) all abutment beneath the triforium roof abandoned, and a single flying buttress, as at Exeter, architecturally treated and soaring high above the aisle roof; (5) the visible double flying buttress architecturally treated, as at Westminster, but essentially a French feature, little used in England, where naves did not soar so high as in France. It is an eminently picturesque feature, but whether it is so admirable from a merely architectural point of view may be questioned. Its appearance round the east end of Nôtre Dame has tempted many a sketcher and etcher —notably Meryon; but after all, it is a little too much like a building propped up with stone scaffolding, indicating a want of repose and a sense of risky construction which does not belong to the best elements of architecture. This analysis of the arrangement of flying buttresses is, however, a good point in Mr. Bond's book, and we do not remember that we have seen it attempted before. We may notice also the remarks in regard to the proportion of clearstory window to wall, as an important point in regard to the skeleton structure of the building; the author remarking how, when it comes to such a proportion as in Westminster, where the window occupies 10 ft. of the width of a bay of 18 ft., and to the even larger proportion of window to wall in many French examples, the upper portion of the wall becomes no longer a wall so much as a pier, the whole masonic structure from base to roof becoming at this point in reality a very narrow and lofty pier, far too lofty in proportion to its width to stand safely alone, but propped up between the vault inside, the flying buttress outside, and the arches of the clearstory windows on right and left; a method of considering the subject which intensifies our conception of Gothic architecture as an architecture of balance of pressures. Yet one may be allowed to question whether such a method of construction is really so impressive or so truly architectural as that of the heavier wall masses and smaller openings of the great Romanesque churches. The tendency to continually enlarge the window-spaces and reduce the piers has been commonly attributed to the growing passion for stained glass; this was the use made of it, no doubt, but we are more disposed to think that the predominant motive was a kind of pride in daring construction, an endeavour to try how far one could go with safety, and especially to outdo some rival builders; for there can be little doubt that rivalry was a prominent factor in the erection of cathedrals. The filling up of the wide window-spaces entirely with stained glass of a rich colour and thick consistency, besides being a decorative object in itself, no doubt had the effect, as Mr. Bond suggests, of masking the tenuity of the masonry structure and giving the eye broad surfaces to rest on; hence the exceedingly detrimental effect of the removal of the stained glass, and ultimate substitution of transparent white glass, in these later large-windowed churches: the voids become too apparent.

Passing over many points of interest which are suggested, we may conclude the present article with some remarks on the interesting problem of the west front and its architectural treatment. Here again Mr. Bond looks at the subject from a rather novel point of view. When a civic building, he observes, such as the Cloth Hall of Ypres, 440 ft. in length, was designed, no one dreamed of making one end of it the principal façade; yet this was what a church architect, for ritualistic reasons, was everywhere compelled to do. The French system was to mask it with twin towers with a partial screen between them to hide the termination of the nave roof. This was the more a natural system for the French to employ, because, partly on account of the great height to which they carried their nave and the crossing arches, they had little opportunity for employing that finest feature of the English cathedral, the central tower at the crossing, and in complete Gothic their predominant towers were always the western ones. York is the only English cathedral since the Romanesque period which frankly adopts the French system of the west front (unless we count Westminster among the cathedrals in an architectural sense), and even at York there is a massive central tower, which however does not dominate the composition, though it might have done so had the spire, which was probably intended, ever been carried out. Canterbury and Lichfield have their complete western towers, but not only are they quite secondary to the central tower, but they do not mask the nave roof, which shows its gable between them, making an awkward and broken-up line of front. York shows the gable indeed, but as it is at a flatter pitch it does not cut so awkwardly into the composition. But it is the only English cathedral front which can be compared with Nôtre Dame, as being distinctly of the same type. Mr. Bond's view of the problem is that as it was impossible to give to the front breadth enough to enable it to dominate, as a façade, a building of which the transepts would project to a far greater width, the "adequate solution" was to give the façade in height what it could not have in breadth. But this consideration seems to us to be only one-half of the matter. It was not only that the west end was narrow in comparison with the whole size of the building, but that the section of nave and aisles, with sloping roofs and lower at the sides than in the centre, gives a form which could never be architecturally impressive in elevation, however well it might work in section. Whatever may be said in favour of the simplicity and architectural honesty of such a treatment, none of the English west fronts which are content with simply showing the end of nave and aisles, with some turreted buttresses to carry off its flatness, can be regarded as anything but failures, having regard to their position. Such a section requires to be masked to make anything like an effective façade. The French tower system is one way of doing it; the screen system, as at Lincoln and Peterborough, is another. The dual tower system is the more effective in itself; the screen system has the advantage that it leaves the central tower the dominant feature, which in the English cathedrals is a distinct advantage, inasmuch as their lower proportions of height not only admit but seem to demand the central tower. The Lincoln screen is rather barbaric in its early detail, but fine in general effect; the defect is that the towers of which the upper portion is seen above it do not seem to belong to it, and are not seen down to the ground. This is also the case with the less important towers at Peterborough, but to say, as the author does, that "they rise in an inexplicable fashion in the rear of the façade" is hardly the right way to put it; that is the case with Lincoln, but at Peterborough the façade was deliberately put in front of them, after they had at all events been founded and commenced. Our main point is, however, that there can be no doubt that in front of a nave and aisle section a screen, either of towers or of another kind, is necessary if anything worth calling a façade is to be established; and that the cathedrals where no such attempt has been made are the best proof of this.

We must defer to another article a consideration of some portions of the Second Part of Mr. Bond's book; merely observing that it is a book which every student of architecture, professional or amateur, ought to have.

AUSTRIAN GOVERNMENT EXHIBITION. — The Gewerbe Verein of Vienna will co-operate with the executive committee of the Austrian Government Exhibition, which will be held at Earl's-court next year, under the promotion and subvention of the Austrian Government. The exhibits will include specimens of the arts and crafts, and examples of the various industries, including the smaller domestic industries of Salzburg, Tyrol, Bohemia, Galicia, and Dalmatia, and illustrations of Austrian scenery. Some of the State establishments, such as the Imperial Mint and the Government printing works, will be represented, and a "Tyrolese village" is to be constructed in the grounds.

SS. SERGIUS AND BACCHUS, CONSTANTINOPLE.

By Mr. ARTHUR E. HENDERSON.

THE church of SS. Sergius and Bacchus is one of those buildings which sets us wondering how it was planned. After the architect had grasped all the ritual requirements of the ecclesiastics he has handed down to us a beautiful and interesting example of Byzantine art. It looks as though after he had settled in his mind, roughly, what his ground plan should be, he designed from the dome downwards. This church is not a basilica, but it is designed on the principle of the central area, and, although the superstructure is carried by eight piers united by semi-circular arches—one left open for the sanctuary, three backed by arcading, and the remaining four angle bays backed by semi-circular semi-domes (these united form an octagon)—yet the plan has a square appearance (see lithograph), the exedræ encircling the four corners. This octagon is by no means regular, as will be obvious in the plan of the gynæceum on the same sheet; each bay varies somewhat, and the eastern is much wider, as it contains the sanctuary, and, of necessity, pushes out the piers of the north-east and south-east bays (exedræ); also, in consequence, the length from east to west is greater than from north to south. It is with the dome the greatest interest lies. By looking at the plan taken at the base of the dome it will be seen, although it stands clearly upon an octagonal bed, that it is divided into sixteen compartments, without the expedient of pendentives. This clever arrangement can be studied also in the plate showing the constructive sections. On looking at the transverse section and comparing it with the plan at the base of the dome (on the same sheet), it will be seen that the dome has sixteen groins, which really are the strength of the dome; their curve is somewhat peculiar, for, although the height of the dome is half the diameter, the sweep is by no means a semi-circle, and from the bed to above the window-heads the radii are greater than half the diameter, but the centres are at springing level. About 5 ft. above this the curves are quick, and again, above, very long radii are taken, with centres considerably below the springing level.

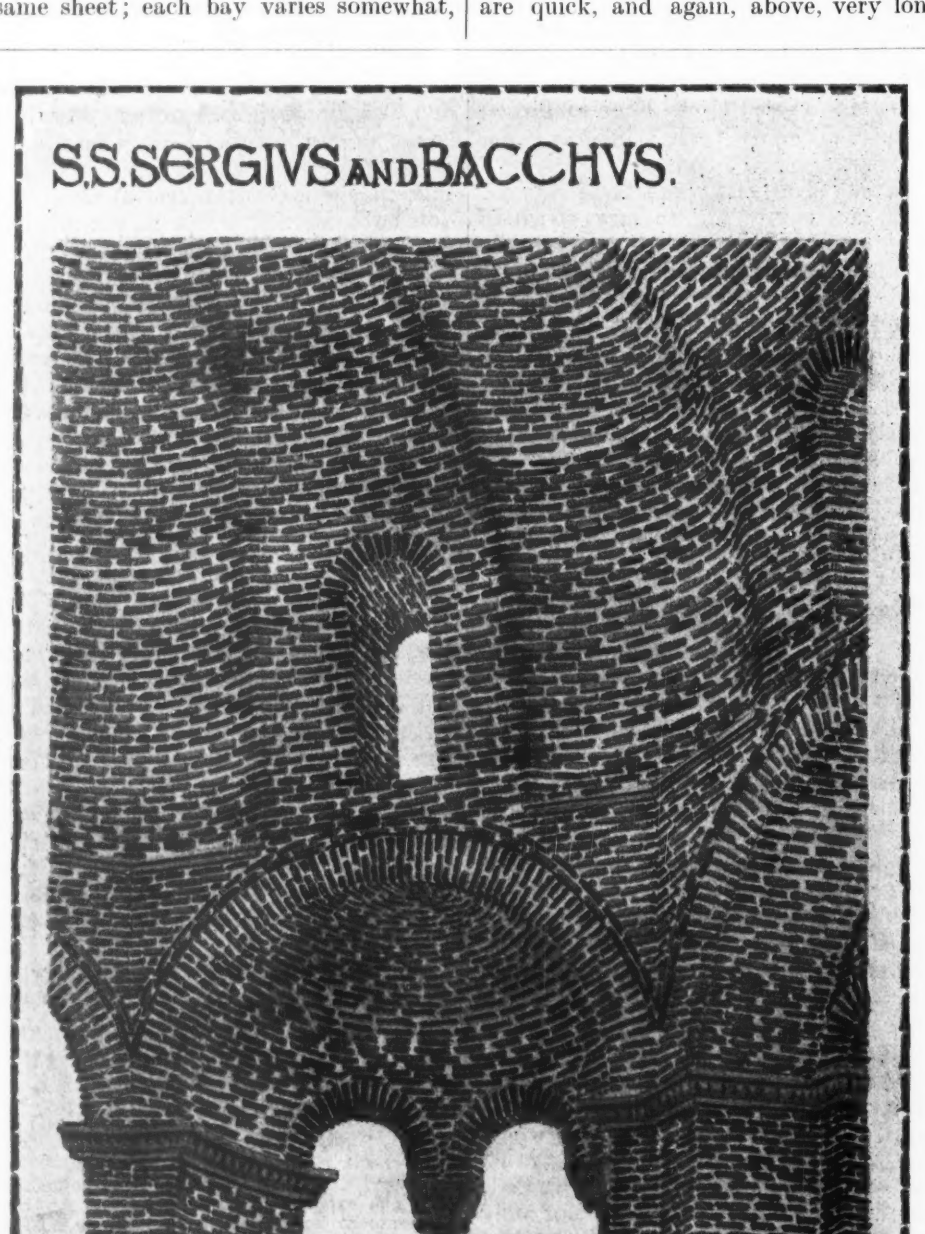


Fig. 1.

It is impossible to say positively whether the beading to the groins is in stone or plaster, but from appearance one would say the latter. Fig. 1 shows the springing of the dome in the brickwork, as it would appear were the plaster entirely removed. Naturally the groins would meet in a point at the apex, but this is obviated by arching them into one another, leaving a saucer-shaped crown in the interior (see the section); and externally (Fig. 2) the Turks have built a large ornamental finial, making it impossible to say how the dome was originally capped.

Eight of the compartments (those over the arches) rest flush with the inner face of the octagon, without a moulding marking their commencement. The webs, if they may be so called, rise on both sides of the windows, easing into a domical curve, and above the window arches they have a common radius in the centre of the dome. Interest lies chiefly in the remaining eight compartments, or those over the piers. They are deeply segmented, or scolloped; the centres of the radii are formed by having three points given, viz.—the groins on either hand and the angle of the octagon in the centre.

With these three points, for each compartment the radius is given and an arc turned, giving the concavity required for each web at its springing. Naturally a small segmental ledge is formed between the groin and angle of octagon, two to each compartment. As the webs rise they are still kept very scolloped, and show externally (Fig. 2) as pear-shaped excrescences, making the other compartments look as though they were concave on the exterior and consequently dangerous. The external weighting and buttressing to the dome is shown on the geometrical and constructive sections, and on Fig. 2. It will be seen that a wall is carried up to about half the height of the dome and filled in to act as counterpoise to the thrust at the haunch of the dome. Each of the sixteen compartments has a square external face; eight resting upon arches, and containing the windows, are the same thickness as the main arches. The other eight faces are the same thickness; they rest upon the piers, but the webs cut somewhat into them. The whole of the wall, with its sixteen faces surrounding the dome, is further thickened on three sides by the walls carried by the gynæceum arcades and semi-domes of the exedræ, but they rise only to the height of the window sills and hardly show on the exterior. The external face is buttressed by the barrel vault over the sanctuary, which abutts against the triumphal arch. The eight sides over the piers are also further thickened to the same extent, but rising to the height of the springing of the dome windows; and on these a small buttress rises in the centre to the whole height of the wall. The buttressing does not end even here, for further buttresses are built against these thickened walls—they run down and rest upon arches built in the massive barrel vault of the gynæceum. Those north and south transmit the thrust to the external walls. At the east

the sanctuary walls act as buttresses, and to the west the arches first span the aisle, and with a second span they reach the external wall of the upper narthex. These arches are well bound in by iron tie beams, which look to be original.

Other buttresses come down these piers and rest partly upon the semi-domes of the exedræ, but principally on the substantial barrel vault, which carries the thrust over the gynæceum to the corners of the church, which are specially massive, and small alcoves are cut out of them.

The Greek ritual and church customs are entirely different from the Latin, and necessitate a totally different plan. In the East women are not permitted the use of the nave during service, but are placed in galleries above the aisles and at the west end—even there they may only look through lattices. The planning of SS. Sergius and Bacchus is exceptionally good in respect to its spacious gallery, for, although the screen crossed under the triumphal arch, it could be seen from nearly all points, and, as most of the service was conducted in a low enclosure outside the screen by the monks and choir, all present near the front of the gallery were able to see and hear. The exedræ at the corners, besides giving a very pleasing contrast to the square bays north, south, and west, help to buttress the dome, give much more frontage to the gallery, and square out the plan. It is a strange anomaly, but the approach to this fine gallery is by a meagre flight of stone steps from the narthex, barely 3 ft. wide, the treads only enough to place one's foot upon, and the risers are as high as 9 in. The south aisle wall is strengthened by two thicknesses of arched walling, erected after one of the numerous earthquakes, very likely soon after the church was built, and probably the one which caused the destruction of the first dome of S. Sophia. The north aisle wall, which acted as a party-wall to the Basilican church of SS. Peter and Paul (now removed and the space occupied by a Turkish graveyard), has numerous arches and bricked-up openings corresponding to the south wall, and the imposts of the buttressing arches, both on gynæceum and ground levels, now show externally. Much of this wall has been repaired, and it is at present quite impossible to find any indication as to the original appearance of this brother church.

Naturally, the ground plan is on the same lines as the gynæceum, but of a slightly more massive description—columns are thicker, and piers take the place of the two columns of the upper narthex. It is unfortunate that the execution of Byzantine designs was carried out in such a careless manner, but this does not account for the great variation in the orientation of the central structure with the external walls. At present the only reason which can be suggested is that the external walls are built upon an earlier foundation, therefore the orientation for the outside of the church could not be adapted to the newer orientation of the nave and sanctuary, and it can be seen at a glance, from the plan, that the apse corresponds with the nave

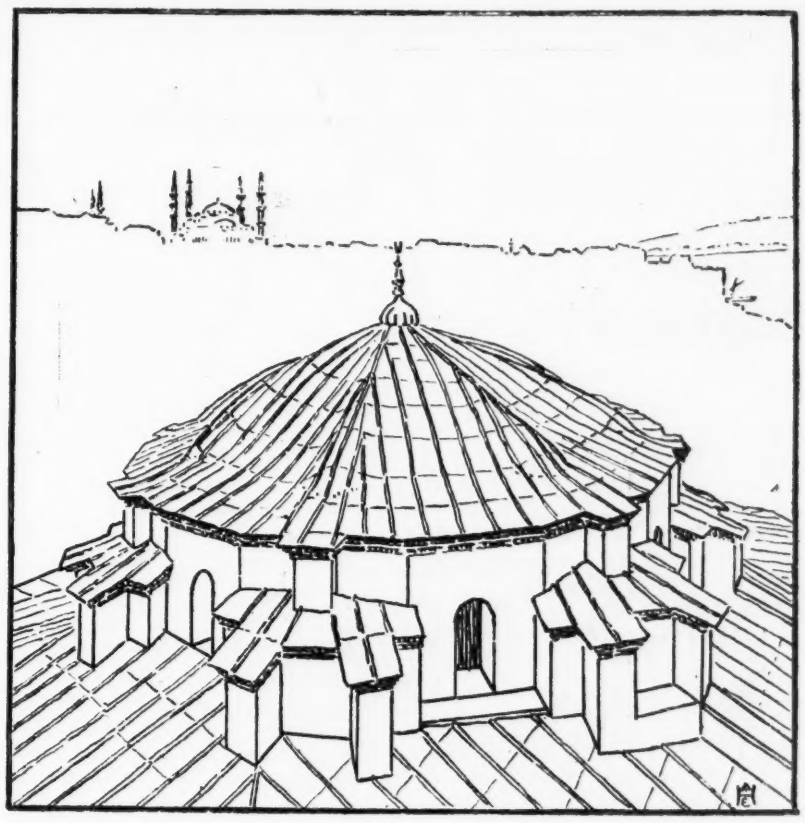


Fig. 2. Sketch of Dome from the Minaret.

and sanctuary, and not with the rest of the exterior. Externally all trace of the monastery to the south has disappeared, as also has the arcaded atrium at the west. The Turks have erected a handsome portico, and added a cloister in front, probably following the old lines of the atrium walls of both churches. The proportions of the interior, unfortunately, have been marred by the Turks placing a joisted and boarded floor upon the pavement, and so covering the bases of the piers and columns, thus stunting the height of the lower arcades, which are at full height too low for our western eyes accustomed to Gothic proportions (see the interior in the plate of Interior Views and Details).

In studying this church one's thoughts turn to San Vitale at Ravenna, a larger church and of more perfect finish, but lacking the variety of design in the nave, so pleasing in SS. Sergius and Bacchus. The proportions of San Vitale are higher and more pleasing when viewed from below, but from the gallery the same extent of nave cannot be seen.

The architectural detail (some of which is shown in the plate of photographs) is very well worth examining, but before describing it it would be well to mention that it is now thickly coated with white-wash, and in some instances to such an extent as to lose the pattern, thus photography does not show the detail to advantage. Classic influence still lingers, but with a much greater freedom than was used when the Church of St. John of the Studium (in the same city) was built, 164 years earlier.

We will look at the details from the ground upwards (see Fig. 3 and photographs). The bases to the columns are Proconcessian marble of uninteresting debased attic form, and the columns are in pairs of Proconessian Verd antique and red Synnadic marbles, filleted with broad bands top and bottom. The capitals, of basket form, are exceptionally beautiful. The abaci resemble in shape their Corinthian prototype; the carving of the baskets shows four tiers of interlacing circles on the eight projecting parts, inclosing leaves and a monogram in centre, and, branching from the circles, leaves spring off into the hollows, their points meeting, all being deeply undercut. The neckings are worked with the capitals and enriched by "egg and dart" pointing upwards.

The cymatia or imposts of the piers are enriched by a repeating design of two spreading leaves on either side of a flower; it is thought by some that these flowers were bunches of grapes, symbolising the name of the martyred Saint Bacchus; but, as can be clearly seen in the photographs, the grapes would be hanging the wrong way. The heavy entablature of the lower order (see plate of Details, sketch, Fig. 4) is another feature of this church—at one time it completely encircled the nave, but now the portion crossing the sanctuary has perished. The soffit of the architrave is enriched by sunk panels of various patterns, and only in two cases has a six-armed cross been used. The beadings to the facias are enriched by a "rope" design, a debased "bead-and-reel," a large, flattish and wide-spreading "egg-and-dart," and above again another "bead-and-reel."

The frieze is in two heights, the lower half a semi-circular pulvinar, elaborately carved and very deeply undercut, the design being of freely growing and twisting acanthus leaves. At first sight it looks so delightful one can hardly call it a design, but on studying it it is found to be a true recurring pattern. The upper half is occupied by an inscription, the background being sunk from the letters, in honour of the Emperor Justinian, the donor of the church, and Theodora. Fig. 5 represents

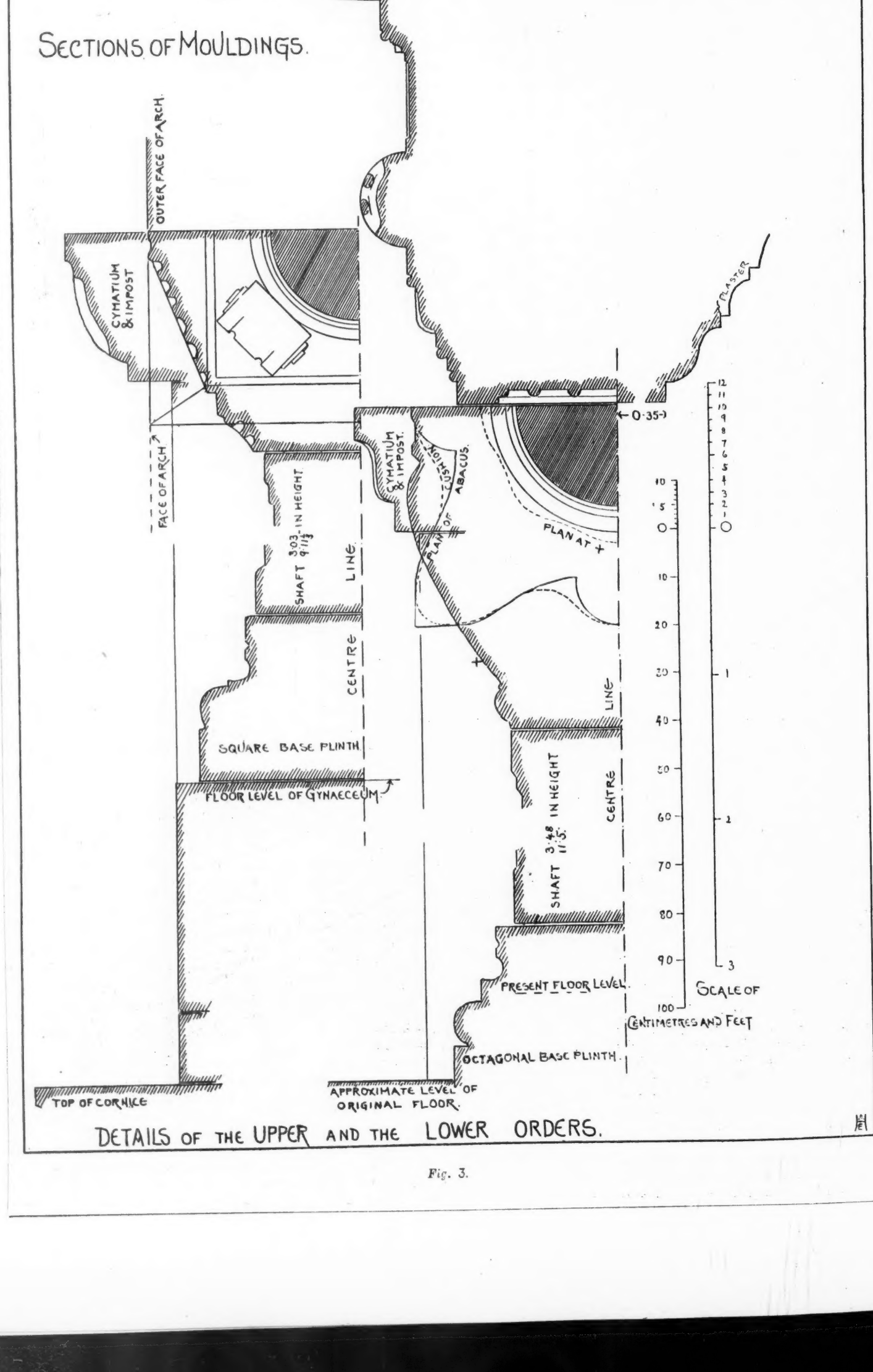

S.S.SERGIVS AND BACCHVS.
SECTIONS OF MOULDINGS.
OUTER FACE OF ARCH.
CYMATIUM & IMPOST
FACE OF ARCH
SHAFT 3.03 IN HEIGHT 9.11½
CENTRE LINE
SQUARE BASE PLINTH
FLOOR LEVEL OF GYNAECEUM
TOP OF CORNICE
CYMATIUM & IMPOST.
ECHINUS
ABACUS.
PLAN OF
PLAN AT
0·35
PLASTER
SHAFT 3.48 IN HEIGHT 11.5.
CENTRE LINE
PRESENT FLOOR LEVEL.
OCTAGONAL BASE PLINTH.
APPROXIMATE LEVEL OF ORIGINAL FLOOR.
SCALE OF CENTIMETRES AND FEET
DETAILS OF THE UPPER AND THE LOWER ORDERS.

Fig. 3.

the lettering of the inscription as cut on the walls. It reads as follows in cursive Greek :—

Ἄλλοι μὲν βασιλῆες ἐτιμήσαντο θανόντας
Ἄνερας ὧν ἀνόνητος πόνος ἔην ἡμέτερος δὲ
Εὐσεβίην σκηπτοῦχος Ἰουστινίανος ἀέξων
Σέργιον αἰγλήεντι δόμῳ θεράποντα γεραίρει
Χρίστου παγγενέταο, τὸν οὐ πυρὸς ἄτμος ἀνάπτων
Οὐ ξίφος σὺχ' ἑτέρη βασάνων ἐδάραξεν ἀνάγκη.
Ἀλλὰ θεοῦ τέτληκεν ὑπὲρ χρίστοιο δαμῆναι
Αἵματι κερδαίνων δόμον σὔρανον. Ἀλλ' ἐνὶ πᾶσιν
Κοιρανίην βασιλῆος ἀκοιμήτοιο φυλάξοι
Καὶ κράτος αὐξησήσειε θεοστέφεος θεοδώρης,
Ἧς νόος εὐσεβίῃ φαιδρύνεται, ἧς πόνος αἰεὶ
Ἀκτεάνων θρέπτηρες ἀφειδέες εἰσιν ἀγῶνες.

The following is the translation :—

"Other Kings have honoured the dead, whose labour was in vain ; but our Justinian, bearer of the sceptre, increasing in piety, glorifies with this splendid building the servant of Christ, Giver of all life, Sergius, whom neither the kindling breath of fire nor the sword nor any other stress of torment has shaken ; but for the sake of Christ, his God, he endured to be slain, winning by his blood a heavenly home. But in all things may he guard the sovereignty of our ever-watchful King, and increase the might of Theodora, crowned of God, whose mind and whose labours are ever bright with piety, and her unsparing efforts are feeders of the poor."

This inscription dates the building of the church soon after the accession of Justinian to the throne, 527.

The cornice commences with small dentils, above which is "bead-and-reel," and consoles project from the facia above, with leaves carved upon their soffits ; a bed mould of "egg-and-dart" surmounts the facia, and runs round the consoles supporting the cyma, the soffit of which is ornamented with leaves, and its face with intertwining acanthus leaves. The whole entablature presents an overloaded appearance, but contrasts greatly with the simplicity of the other portions of the church.

Rising to the gynæceum level, we find it is about 20 ft. above the ground and, strangely, 2 ft. above the cornice below. Here, again, the bases require no special remark, neither do the columns, which are considerably less in size than those below, but the capitals are well worthy of note.

I am of opinion that Byzantine Constantinople was strongly influenced by the architecture of Ionia and its neighbouring provinces — Ephesus, Miletus, Tralles, and Hierapolis, with other prosperous cities—all erecting handsome buildings during this period, and we know that the architects for S. Sophia were natives of Tralles and Miletus. Looking at the capitals shown in the Plate we still see vestiges of Ionic volutes, but they are merely ornamental angle brackets to square dosserets above—this dosseret device allowed a column of small diameter to carry the springings of wide stone or brick arches above. In San Vitale the expedient of placing a simple capital above the rightful one is only a makeshift. The carving on the dosserets is a free form of acanthus, only the front faces being undercut, and each carries a monogram of Justinian worked in the centre of the design. The upper cymatium is enriched by upright flutings.

Six columns have, as yet, been unnoticed ; two are in the south aisle (see one in Plate of Details), having a wide fillet worked on both sides of the bases, columns, and capitals, showing a framework of stone or wood was affixed to them. At one time, evidently, here was the approach to the monastery. The capitals are of simple Byzantine shape with monograms worked in a very free treatment of stems and leaves. Above these columns stand another two in the gynæceum, of poor design, which seem to have been brought from elsewhere and adapted to their positions ; the one capital to the west is debased Ionic with dosseret, a cross being carved upon it, and the other is of basket form, with roundels carved on the faces.

The remaining two columns connect the western aisle of the gynæceum with the upper narthex (see Plate of Details), and are of similar pattern, but stouter, to those of the gallery. There is a strange lack of the cross in all the carving of the church. Dedication crosses were inlaid into the columns, certainly, otherwise, except in the three cases mentioned, there is no indication of others. No mosaics have been found in the church ; fresco paintings there may have been ; if remaining they are covered by whitewash and the new decorations. As far as can be ascertained, brick was the material used for walls, piers, vaults, and domes. By settlements, due mostly to earthquakes, the whole church has been greatly damaged and badly restored, but the original dome, though distorted, still stands.

It is generally remarked that SS. Sergius and Bacchus is the prototype design of the cathedral church of S. Sophia—it certainly is of the same school of architecture, and the planning of the gynæceum has a likeness to it, in regard to its western bay and angle exedræ ; but in S. Sophia the transeptal arcades are the same width as the diameter of the nave, thus making the whole length of the nave a double square, whereas in SS. Sergius and Bacchus it is a single square. Again, in S. Sophia pendentives are used throughout ; in SS. Sergius and Bacchus there are none. The large semi-domes of S. Sophia spring from the same level as do the exedræ and other arches, but in SS. Sergius and Bacchus spandrels are carried up on both sides of the arches, and the dome stands upon them. In S. Sophia Byzantine architecture is now fully developed, arches being placed upon all columns, and a new form of Ionic capital suitable to carry these arches was invented, but in SS. Sergius and Bacchus the architrave is still an important factor in the design. It is unfair to a small church to compare it with a cathedral, though SS. Sergius and Bacchus stands the comparison with great credit, and is one of the finest Byzantine monastic churches erected.

A few of the principal dimensions are as follows :—

	Ft.	In.
The whole internal length from east to west ..	120	
The length without narthex	101	
The length of aisles, about	86	
Width, including aisles (not including recess in south wall), average	77	6
Width, excluding aisles	59	
Length of octagon	53	6
Width of octagon	50	6
Length of dome	55	
Width of dome	52	6
Width of square bays—north, 16 ft. 3 in. ; south, 16 ft. 6 in. ; west	17	

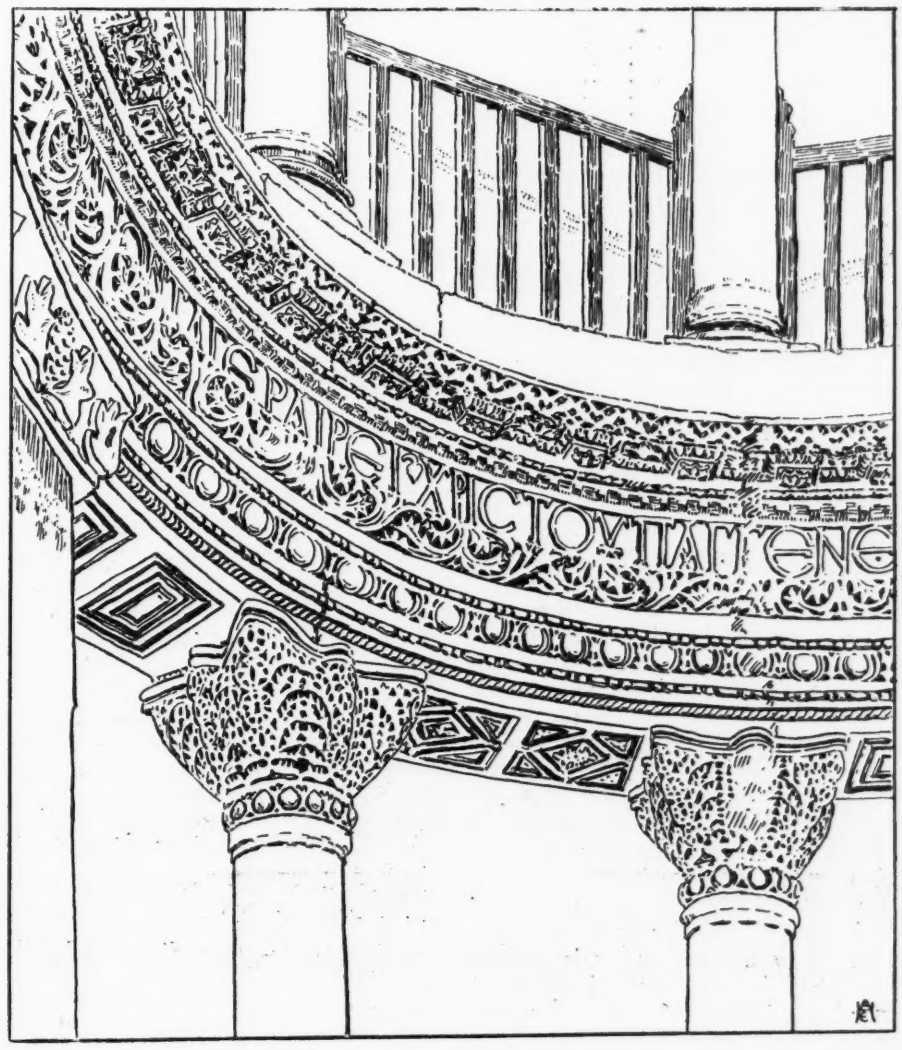


Fig. 4. Entablature of South-West Exedra.

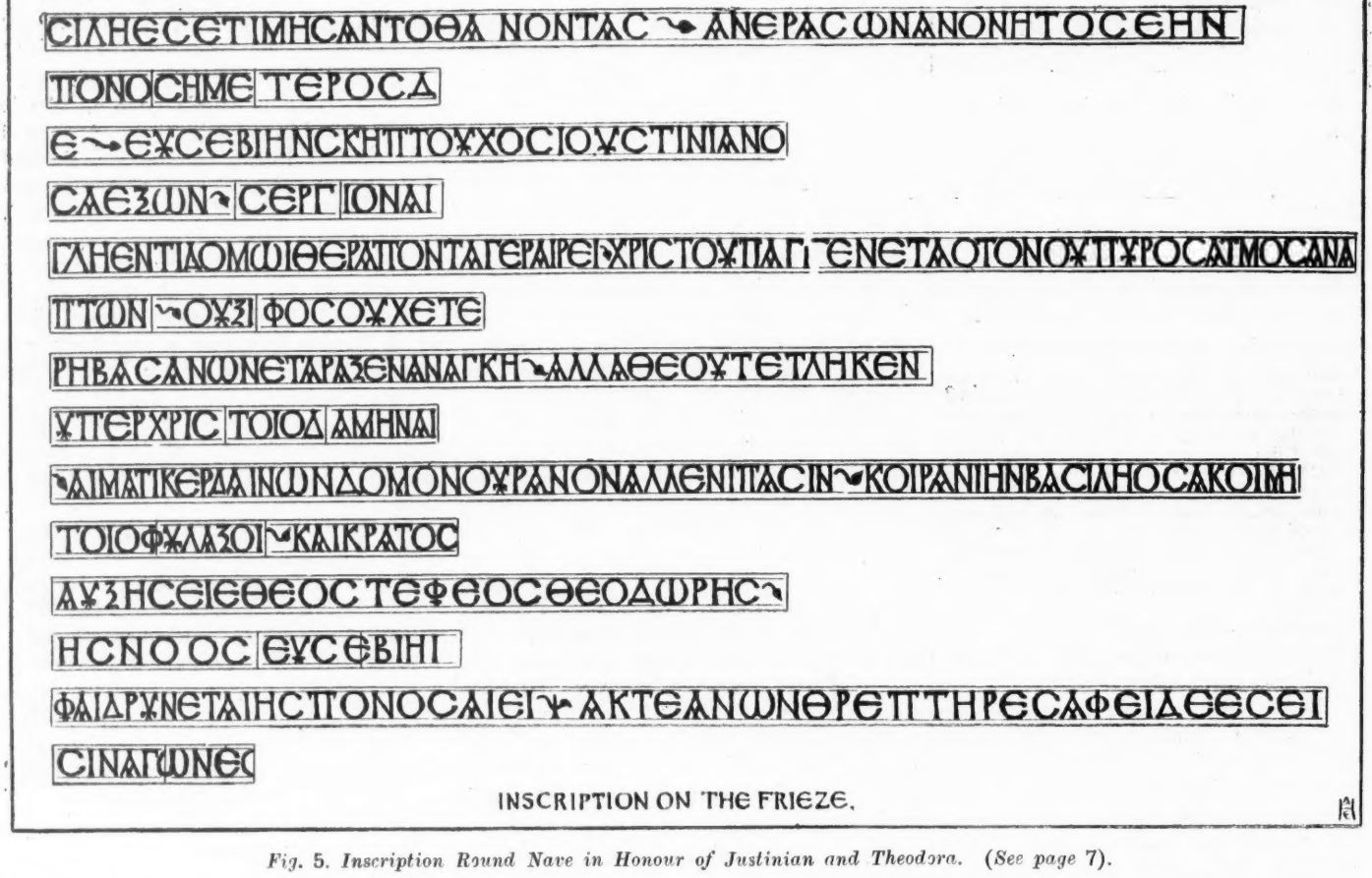


Fig. 5. Inscription Round Nave in Honour of Justinian and Theodora. (*See page 7*).

	Ft.	In.
Depth of square bays, not including arcades, 4 ft.	—	6
Width of exedræ, average	17	
Width of impost piers to arcades, average	2	9
Width between the piers of triumphal arch	21	6
Thickness of triumphal arch	4	
Width of sanctuary	26	
Depth of sanctuary	12	
Radius of sanctuary apse, about	12	3
Length of narthex	70	
Width of narthex	14	6
Height from floor to crown of dome, about	71	
Height from floor to springing of dome	45	
Height from floor to springing of main arches	33	6
Height from floor to gynæceum	20	
Height from gynæceum floor to crown of vault, average	18	6
Height from ground floor aisles to vault, average	18	3
Height of upper colonnades	12	7
Height of lower colonnade	14	9
Height of entablature	3	5

NOTES.

Re-afforestation.

DESPITE the efforts of one or two organisations for encouraging the re-afforestation of suitable areas in the British Isles, little has been accomplished in this direction, and practically no general interest is felt in the subject. Our supplies of timber for structural and other purposes are drawn largely from abroad, but there are already indications that in process of time ordinary varieties of timber will not be exported so readily as at present. Fir and pine are growing scarce in the United States, where re-afforestation has become a necessity, and is looked after by a Government department. Notwithstanding the extensive forests existing in Canada it is highly probable that the agricultural and industrial development of that country—now proceeding by leaps and bounds—will in a comparatively short space of time deprive us of a resource hitherto looked upon in the light of a bottomless well. The position is one that ought to be faced, especially as the remedy of re-afforestation cannot bring relief until after the lapse of many years. In these islands we have, roughly, 15 million acres of mountain and heath lands more or less suitable for afforestation. The value of such lands is small, but might become very considerable if devoted to the growth of timber upon a proper basis. Further, the establishment of a new industry would do much towards the solution of the great unemployment problem.

House Property and Street Widening.

AT a time when so many street-widening schemes are being carried out decisions under the old Act of Parliament known as Michael Angelo Taylor's Act (57 Geo. III. cxxix) are of general interest, since the local authorities derive their powers to acquire property for this purpose from this ancient statute. In our issue of August 19, 1905, in a Note on the case Pescod *v.* Mayor, etc., of the City of Westminster, we referred to the law on this subject. The latest case is Thompson & Jackson *v.* Hammersmith Corporation, where the plaintiffs were lessees of land and a double shop in King-street, Hammersmith, and were about to considerably alter the premises under the terms of their lease when the Corporation sought to acquire a strip varying in depth from 5 ft. 2 in. to 7 ft. 2 in. of the frontage to High-street. The plaintiffs contended that they must take all the premises. It has been decided that sect. 82 of the Act is subject to sect. 80—that is to say, since sect. 80 speaks of "any part of" the premises being acquired, sect. 82, which deals with the compulsory acquirement, is to be read as containing a like provision (*see* Gordon *v.* Vestry of St. Mary Abbotts, 1894), and that the test as to whether a part may be acquired or the whole must be taken is, can the portion desired to be taken be removed, still leaving the house as a house capable substantially of being enjoyed as before (*see* the same case and Gibbon *v.* Paddington Vestry, 1900). In the present case it was attempted to differentiate the law on the ground that the plaintiffs themselves were about to pull down portions of the house; but this contention did not prevail, and the Court held that the portions required by the Corporation destroyed the house as a house, and that the whole premises must be taken.

Kingsway Tramway.

AT last the shallow underground tramway is practically ready for operation, and will be opened to the public after the official inspection of the Board of Trade. The new line will be worked in connexion with the electrified tramway route between Southampton-row and Islington, and passengers will then be able to proceed without change of car from the Angel to the Strand, and *vice versâ*, the alteration of level taking place by means of the incline at the junction of Southampton-row and Theobald's-road. Owing to lack of foresight, or to an unusual, and in this case unwise, impulse in the direction of economy, it is impossible for the ordinary rolling-stock of the London County Council to enter the

subway. Consequently, single-decked cars have been built specially for this service. The disadvantage may appear small at the present time, but when the line comes to be extended and placed in communication with the southern system of tramways, none of the cars now running on the latter will be able to pass along the new subway. It would be interesting to hear what the County Council have to say upon this point.

Water Supply in Leicester. OWING to the low rainfall during the end of last year, the water authorities of Leicester are experiencing the utmost difficulty in providing supplies for the inhabitants. Water is already shut off for ten hours out of the twenty-four, and the period of supply will probably be further curtailed. One of the three corporation reservoirs is practically dry, and the others contain less than one-fourth of the normal quantity. A disused colliery shaft is at present yielding about 300,000 gallons a day to supplement the supply from the waterworks, and so critical is the situation that water to the extent of some 200,000 gallons a day is being drawn from a well close to the Belgrave-road cemetery. An idea of the grave emergency that has arisen is to be gathered from the statement that water is being pumped direct into the mains at a point only a few yards from a place where dead bodies lie and others are being buried daily. It is reassuring to learn that the water is found to be wholesome, but in these days of hygiene the procedure seems a strange one, and the inhabitants are far from feeling satisfied as to its wisdom. The case of Leicester serves to emphasise the necessity for dealing in a comprehensive manner with the question of water supplies, and of apportioning available sources so that large towns unable to draw upon gathering grounds in the mountains of Wales and the Lake district, may be reasonably free from the risk of famine, without prejudice, of course, to the requirements of smaller centres.

Railway Amalgamation. THOSE persons who live on what is known as the old London, Chatham and Dover Railway lines begin to wonder when the benefits which were promised to them on the amalgamation of this company with the South-Eastern Railway Company are to be conferred upon them. It cannot be denied that the amalgamation has been of benefit to this latter company, as when the Chislehurst tunnel subsided the Chatham Company's lines were invaluable to them, and now that Charing Cross station is closed the Chatham lines termini are again of service to them. The South-Eastern Company, however, offers no *quid pro quo*. The passengers by the London, Dover and Chatham lines suffer by the dislocation in the service, and their trains are made unpunctual owing to the assistance rendered to the South-Eastern Company, yet no facilities of quick communication between the two systems have been offered them in return. To pass from the Maidstone and Chatham branches to the South-Eastern main line is just as difficult as it was when the two companies were running in opposition to one another; indeed some of the time-tables seem to have been preserved as models of railway obstruction to rapid means of transit.

Tramways v. Light Railways. THE Parliamentary paper recently published with the returns relating to tramways and light railways contains some very interesting statistics. The return goes back to the year 1878, when the route mileage was only 269 miles, the capital expenditure some 4,000,000*l*., and the number of passengers 146 millions. The route mileage is now 2,116·78 miles, the capital expenditure 52,675,152*l*., and the number of passengers 2,069 millions. It is not hard with the assistance of these figures to understand the depression in our railways. Electricity is making rapid progress as the means of locomotion, as, out of the 2,117 miles now open, 1,780 miles are worked by electricity. Although the capital expenditure per mile is originally much larger than for steam or horse traction, exceeding them both by, roughly speaking, one-third, the net percentage of receipts to the capital outlay is nearly double that given for steam and horse traction, whilst the percentage of working expenditure to gross receipts also shows a diminution, and the average fares are also at the same time slightly lower. The return shows that the local authorities still continue to absorb this class of undertaking, which possibly is the most profitable they have yet attempted to manage. Continued improvement in electric locomotion is, however a factor yet to be considered, and at any moment the ratepayers may find themselves pledged to increased capital expenditure, or, in place of this, the general public may be condemned to use antiquated and obsolete systems on account of the municipal monopolies.

"Clinton" Reinforcement for Concrete. A NEW power-house recently built in Baltimore illustrates the value of steel network for the reinforcement of concrete for building construction. This power-house is 180 ft. long by 72 ft. wide, and is 70 ft. high above the ground floor. In place of the steel rods generally used to reinforce the floor slabs Clinton electrically-welded fabric was employed. This form of netting was selected for two reasons; first, because being supplied in long lengths the architect was able to make the reinforcement continuous for the whole width of the building; and second, because the transverse wires of the fabric not only keep in position the longitudinal wires, but provide for the resistance of any strains that may be exerted at right angles with the latter. The continuous bond provided by the steel netting permitted considerable economies to be made in the upper part of the building, which contains the coal bunkers, and consequently has to bear heavy strains. One great advantage of using reinforcement in the form of sheets is that there are no bars or rods liable to be wrongly placed by workmen. Consequently the cost of superintendence can be considerably reduced. Similarly satisfactory results have already been secured by the use of expanded metal.

Bombay Harbour Works. DURING his visit to India, in 1875, the King laid the foundation-stone of the first dock in Bombay harbour. Now, after the lapse of thirty years, the Prince of Wales has inaugurated the equally important work by laying the foundation-stone of the Alexandra wet dock and a new dry dock, basins that will probably serve to accommodate the largest ocean steamships that are likely to be built for the next thirty years. The dimensions of the dry dock are based upon the requirements of a vessel 1,000 ft. long by 100 ft. beam, and a draught of 36 ft. Quays are to be built near the entrance to the docks, permitting the largest steamers to be berthed alongside so as to land passengers without the aid of tugs and lighters before discharging cargo in the Alexandra dock, which will have a water area of nearly 50 acres, and about 3 miles of quays and transit sheds. These works, involving an outlay of more than 2¼ millions, form only part of the extensive programme inaugurated in 1873 by the Bombay Port Trust, and when they are completed Bombay will be not only one of the finest natural harbours in the East, but probably the best equipped port in that part of the world. Something more is to come, however, for the Trust have under consideration a great scheme for reclaiming nearly 600 acres of land along the shore of the harbour that would give space for 2¼ miles of quays, and probably facilitate an extension of the city that would do much to relieve the overcrowded condition from which it now suffers.

Sanitary Condition of Barnard Castle District. DR. E. P. MANBY'S Report to the Local Government Board upon the sanitary circumstances and administration of the Barnard Castle and Startforth Rural Districts (which are comprised within the Teesdale Union), states that in the Barnard Castle Rural District the houses are built of stone but defective in various points. At Middleton, in the main street, a number of houses have been built so closely together as to contravene the most elementary rules of sanitation. Windows where existing in houses are often so fastened up by paint or otherwise that they cannot be opened. Water supply has been much neglected and is from sources liable to contamination. Few water-closets exist in the district, except at Middleton and at Gainford. Privy-middens are chiefly in use, many of them dilapidated and foul. Some pail closets were met with, but sufficient attempt has not been made in the past to get pails substituted for privies. In regard to the Startforth Rural District, the Report is much the same. In regard to water supply it is stated that in some villages where the supply of the Tees Water Board is available, on the ground of expense many residents refuse to have this water, and continue to take their supply from wells :—

"There are public wells at Mickleton, Romaldkirk, Ovington, Hutton, and other places. The quality of the water derived from these wells is said to be satisfactory, but the supply cannot be described as reasonably accessible for all the houses in any of these villages. At Rokey School, Wycliffe School, Brignall Mill, and other places, I saw water used for drinking, which either was obviously contaminated, or was exposed to the possibility of animal and vegetable contamina-

tion. The medical officer of health reported unfavourably on the water supply at Thwaites Farm as long ago as April, 1901, but no action on the Report has been taken by the Rural District Council. The tenants have to go to a spring some 200 yds. distant for their supply of drinking water. The carrying of water for considerable distances is not infrequent in the case of isolated houses in the district."

The main point of Dr. Manby's Report is that there are three medical officers for the two districts, no one of whom has much time to give to the work of inspection, and that a single competent medical officer ought to be appointed for the whole area, at a salary that would enable him to devote his time to the work, and would organise a uniform system of sanitary improvement.

Report of Enteric Fever at Basingstoke.

THE Report by Dr. Reginald Farrar to the Local Government Board on the causes of an outbreak of enteric fever at Basingstoke, which appears to have commenced suddenly and as suddenly ceased, is a very interesting one as showing the slight causes which may infect a water supply so as to cause disease, and the necessity of constant vigilance in guarding against any contamination of water supply. We have not space to go into the details,* but the Report is very instructive as to the manner in which accidental sources of contamination may arise, and also in showing the method of investigation and reasoning by which the mischief was traced to its probable source, a temporary leakage of a small percentage of sewage matter into an otherwise satisfactory chalk well from which water for the town service was pumped. The following paragraph is worth quoting, as an illustration of the close relation between cause and effect in cases of this kind :—

"The following case, which may be thought to have almost crucial value, occurred among the domestics of one of the medical practitioners in Basingstoke. All water used for drinking in this house had been systematically boiled since the beginning of the outbreak. But on a single occasion, and, so far as can be ascertained, on one occasion only, viz., on October 21, a servant maid drew off one glass of unboiled water from the tap and drank it ; this girl went away to Alton, on October 23, and was notified at Alton as suffering from enteric fever on November 1, eleven days after drinking the water. It will be noted that this incident occurred on the very day before the disinfection of the mains was carried out, and is consistent with infective matter having remained in the mains for a considerable period after its introduction to them may be inferred to have occurred."

Trees in Towns.

MR. F. G. HEATH recently called attention in the *Times* to the necessity of systematic tree-planting in towns. The moment is opportune for reference to this subject, because for another month the planting of deciduous trees may continue. That the planting of trees in towns should be carried on on a systematic plan is obvious. Both in London and the provincial towns it is done, as one may say, either experimentally or spasmodically. There is not a town in England, especially in the suburbs, where the planting of trees would not be an improvement. We wish a society could be formed to press this matter on the notice of local authorities. It is certainly an anomaly that whilst in the country private individuals spend so much thought and money on gardens and shrubberies, local bodies show so little energy or taste in this direction. On the Continent, where private gardens are far inferior to those of England, tree-planting in cities and suburbs is carried out constantly and systematically.

* The Report can be obtained from Wyman & Sons, London ; Oliver & Boyd, Edinburgh ; or, E. Ponsonby, Dublin : Price 1s.

The Six Landscape Painters' Exhibition.

THE exhibition of the works of six landscape-painters—Messrs. R. W. Allan, Aumonier, Austen Brown, J. S. Hill, Peppercorn, and Leslie Thomson—again makes its annual appearance, always a pleasant and interesting event. The pictures, forty-eight in number, are hung in the Gallery of the Old Water-Colour Society. Taking them in the order of hanging, those of Mr. Austen Brown, Nos. 1, 5, and 6 at all events, hardly come properly under the definition "landscape," being foreground pictures in which figures or animals are prominent. "An Early Autumn Afternoon" and "After Sundown" (2 and 3) are rather slight paintings of very different aspects of nature—different in method too, showing that the artist is not a painter of one effect. Mr. Leslie Thomson's best work is perhaps "The Brook" (10), where a stretch of distance is framed in foreground foliage, and a group of girls bathing in the brook make a bright centre to the composition. Among the others are "Norham on the Tweed" (7), a flat country with a river zig-zagging through it ("Rura quæ Liris quietâ mordet aquâ"), and "Holyhead Mountain" (13), a level composition divided by a strong line of water and distant hills one-third up from the foreground. In Mr. Hill's largest work, "Magdalen Tower" (17), the sky presses heavily on the composition ; and in "The Thames at Milbank" (19) the Houses of Parliament are not kindly treated. "On the Welsh Coast" (18), one of the smaller works, is a powerful little picture of waste land. Mr. Peppercorn's heavy and colourless landscapes, with blottesque masses of trees, we cannot accept as nature or even an adequate translation thereof ; "Twilight" (28), where there are no trees, represents better what this artist can do in giving the sentiment of landscape ; but on coming to Mr. Allan's "A Grey Day" (31), in spite of its title, we are inclined to exclaim with Milton "Hail, Holy light!" for here at least there is light and colour ; the sea is very well treated too. "The Approach of Winter" (32), a hill picture with touches of snow, is fine ; so is "A Haven of Rest" (36) and "In from the Sunlit Sea" (39), both notable for colour and calm light ; "Autumn" also (34) is a good little wayside composition. Mr. Aumonier, whose works occupy one end of the room, has the best of it in the exhibition ; his large melancholy landscape, "A Lonely Heath" (43), is unquestionably the most powerful work in the room ; and "Sunlight on the Downs" (46), with the varied lights over the long folds of down, show how well he can treat a subject of totally opposite character. If we cannot admire the works of all the six painters equally, it is always interesting to be thus reminded how many different ways there are of interpreting nature through the medium of painting.

LETTER FROM PARIS.

IN 1899 the Municipality of Paris purchased, for 300,000 francs, the Hôtel de Lauzun, which was condemned to be demolished. The Council at the time proposed to reconstitute the building as a typical example of a first-class mansion of the XVIIth century. The cost of restoring it completely, however, was seen to be so great that the proposal was abandoned. The suggestion to transform it into a museum, as a kind of annexe to the Carnavalet Museum, was also dismissed, on account of the inevitable injury to, or obscuration of, the wall paintings and wood carvings which decorated the walls. Consequently, not seeing any way to make use of it, the Council has ceded it to Baron Pichon, grandson of the last proprietor, who intends to make it his home, and has consented to reimburse the Municipality for all its expenditure in connexion with the building, and to put it in complete repair. The Hôtel, it may be observed, is scheduled among the "Monuments Historiques." All the money gained or recovered by the Municipality, in connexion with the transaction, is to be devoted to the enlargement of the Carnavalet Museum, which will permit of the exhibition of many objects of historic interest not at present exhibited to the public.

Having settled this question, the Council is now occupied with the Hôtel Bagatelle, which still remains empty. The Park of Bagatelle is to be transformed into a kind of ornamental botanic garden which is to be planted with specimens of as many as possible of trees and plants of French growth. The house itself is to be made use of for periodical art exhibitions, organised either by individuals or societies, and the sums arising from entrance money will be set apart for the purchase of works of art for the Municipal museums.

The Municipal Council is also occupied recently with the consideration of the completion of the Metropolitan railway system, comprising six new lines, to be carried out at a cost of 200 million francs. The first line will prolong to the Hôtel de Ville that of the Palais Royal, which was to have ended at the Cour de Carrousel. The second line, starting from and returning to the Invalides, will form an interior "ceinture" line with stations at the Place de la Concorde, Rue Royale, Grands Boulevards, Boulevard Henri IV., Rue Cuvier, Rue des Ecoles, Rue Monge, Boulevard St. Germain, and Rue St. Dominique. The third line will run from the Porte de Picpus to the Porte d'Italie, by way of Avenue St. Mandé, Boulevard Picpus and Boulevard Voltaire, Place de la République, La Cité, Rue Monge, and Avenue des Gobelins. The fourth is to go from the Place de la Bastille to the Porte de Montreuil by way of the Faubourg St. Antoine and Rue de Montreuil. The fifth is the prolongation between the Opéra and the Trocadéro of a line already voted for the Boulevard Haussmann and the Rue La Boétie and Rue Pierre Charron. The sixth will go from the church of St. Augustin to the Ternes, by way of the Boulevard Haussmann, the Faubourg St. Honoré, and the Avenue des Ternes.

The jury of the Ecole des Beaux-Arts appointed to judge the Godebœuf competition have awarded the prize to M. Danis, a pupil of M. Deglane. The subject given for the competition was "Les Portes d'un Hôtel."

In a few days there will take place, at the Rond-point des Ternes, the inauguration of Bartholdi's monument to the aëronauts and the carrier-pigeon societies of the Siege of Paris. This, the last work of the sculptor, is much inferior to most of his productions. M. Mercié's monument to Alfred de Musset will also soon be in position. Of other statues soon to be erected in Paris may be mentioned that of Baron Taylord, to be placed on the Boulevard in front of the Théâtre de l'Ambigu ; that of Theodore Roussel the philanthropist, to be erected on a site in the Eleventh Arrondissement ; and a monument to Carpeaux, executed by his pupil Fagel, which it is proposed to place in the Jardin de l'Infante at the Louvre.

The works are shortly to be commenced for the enlargement of the Palais de Justice, after the plans of M. Tournaire, architect to the Department of the Seine. The works necessitate the total demolition of the picturesque old houses forming a large quadrilateral bounded by the Boulevard du Palais,

the Quai des Orfèvres, and the Rue de la Sainte Chapelle, which latter will alone remain and will form a kind of interior court to the new portion of the Palais, with entrances from the Quai and from the Boulevard. On the new plan the Quai des Orfèvres will have a width of 19 mètres between the Rue de Harlay and the square tower situated at the corner of the Quai, which will form a symmetrical pendant to the Tour de l'Horloge at the angle of the quay of that name. The new buildings will be connected to the old ones by a footbridge thrown across the Rue de la Sainte Chapelle. The cost of their construction is estimated at 10 million francs.

The separation of Church and State recently voted will have its effect on art, in an unexpected manner, since it will permit of the utilisation of a site for a museum to contain the Luxembourg collection. It is proposed for this purpose to take possession of the large garden of the Seminaire Saint-Sulpice, which will before long be "disaffectée," and which will afford an ample site for a new Luxembourg. Considerations both of legal arrangements and funds will, however, defer for some time the realisation of the scheme.

There is at last some talk of relieving the Ile de la Cité of the untoward building of the Morgue, which rises behind the *chevet* of Nôtre Dame. This melancholy establishment is, it appears, to be transferred to a site at the eastern extremity of Paris, beyond the Port au Vin and on the margin of the Quai Saint Bernard, near the buildings of the Fourrière, the reconstruction of which is shortly to be the subject of a public competition.

The death is announced, at the age of 65, of B. Delahaye, "architecte-expert" to the Tribunal of the Seine, and Director of the "Reforme du Bâtiment," who had rendered excellent service in the professional defence of architects. We should mention also the death of M. Amedée Pigeon, a distinguished writer on art, and for many years an assiduous contributor to the pages of the *Gazette des Beaux-Arts*.

THE OLD MASTERS EXHIBITION.

THE loan exhibition at Burlington House this year is not a very remarkable one, and we are not sure that the most interesting section of it is not that included in Gallery IV., which consists principally of works by artists not long ago deceased. Here we have the opportunity of seeing once more Millais' remarkable picture "The Knight at the Ford" (115). Near it hangs what is perhaps Rossetti's best work, "The Beloved" (117); the one which shows most of his power of colour and least of his defects of design. The figures show little more than a collection of heads; that of the beautiful blonde, the bride, in the centre, surrounded by attendant faces, while below her the head of a negro boy holding up a gold cup makes a remarkable colour contrast with her fair face and bright green drapery. The whole picture is an inspiration in decorative colour and design, and the faces are not disfigured by the large and sensual lips which Rossetti was too fond of, and which appear so disagreeably in the adjoining picture of "Mnemosyne" (119), which represents Rossetti's shortcomings as decidedly as the other work represents his best powers. Various paintings by Burne-Jones appear in the same room, of which the best is the well-known "Love Among the Ruins" (128), beautiful in itself, though quite at variance with the full-blooded passion of the poem by Browning which gives the title to the picture. There is the "Laus Veneris" also (121), another fine work of its kind, and "The Princess Sabra Drawing the Lot" (122), before which one's first thought is—what a collection of weak and feeble heads! Albert Moore's decorative nude, entitled "White Hydrangeas" (111), is a typical example of that artist's power over delicate and refined colour-schemes; and close to it, as if to present the most intense contrast possible, is one of the finest and most highly elaborated of Lewis's wonderful Oriental scenes, "An Intercepted Correspondence" (109), sparkling all over with brilliant colour and delicate detail. Two very fine landscapes by Alfred Hunt, "Whitby: Morning" and "Whitby: Evening" (130, 132), are to be found in the same room; pictures the delicate colour and atmospheric effect of which are intensified by contrast with the commonplace and heavily coloured figure-painting by a late R.A. which hangs between them. There is an ironical significance in the fact that the painter of the two landscapes which hang on each side of this was never invited to become a member of the Academy.

Coming to the older pictures, Gallery I. is rather a medley of some fine things and a majority which are not of much interest. There is Reynolds's excellent half-length portrait of himself (5); some Hogarth portraits of which the best is "Mrs. Desaguliers" (2), and his "Assembly at Wanstead House" (20), which, if it be (as we are told) his earliest known picture, is of interest as a kind of prelude to the more incisive studies of contemporary fashionable society which he was to produce later. How, by the way, did Hogarth obtain that knowledge of the foibles of dress and manner of the fashionable society of his day which he portrays with such convincing power in "Marriage à la Mode"? He could hardly have been admitted into these sacred but unsanctified circles. It was the same insight of genius, perhaps, that enabled Thackeray to portray the fashionable life of his own day when as yet he was personally outside its boundaries. Of the other portraits in the same room, there are Gainsborough's of his two daughters (10) and of Miss Adney (18), both careful and refined; Raeburn's very fine and energetic half-length of John Gilbert (17), and a half-length "Portrait of a Girl" (21) by the same painter which in colour and in characteristic expression is worthy of Reynolds, whom it rather recalls. Romney's "Mrs. Dawes" (29) is interesting because it is so different from the usual Romney style and scale of colour; it was painted in 1783, when he was in the middle of his career, and therefore at the same time as some other (and finer) works in a totally different style. One is almost tempted to ask whether it can really be his; but we have not heard of any doubt being cast on its authenticity. Opie's head of "Mrs. Warde" (35) is perfectly charming in design and colour and in a certain *espiéglerie* of character, and raises one's idea of this artist's powers. In the centre of one wall is hung Turner's remarkable attempt to emulate Titian, the "Venus and Adonis" (28) which was exhibited some little time since in the gallery of a London dealer. The figures, as might be expected, are hardly immaculate in drawing, but the bold and unusual treatment of the sky and the landscape background leaves one in no doubt that Titian was in the mind of the artist when he painted this. Two of Richard Wilson's landscapes (4 and 6) show Wilson's limitations rather than his success; the kind of thing that Wilson could best do is seen in the smaller picture, "The Lake of Albano" (16). De Wint's "Lincoln" (9) is heavy and unsatisfactory; the "Cornfield" (11) shows more of the real de Wint. Gainsborough's attempt at a classical landscape with ruined architecture is not in his best way.

Gallery II. contains some fine things, among which we ought to mention first a superb architectural scene by Holland (63), one of the finest and most effective of his scenes of Venetian architecture. It is a real interest, too, to see the very fine portrait group of "Mrs. De Wint and her Daughter" (62) by Hilton, since it goes to explain the position held among his contemporaries by a painter whose fame seems somehow to have suffered eclipse in these days; the taste which dictated his large historical pictures is *passé*, but there is nothing *passé* about this portrait of his sister and her child, which for power of handling and colouring will hold its place anywhere. Reynolds's beautiful and well-known group of the Hon. Frances Harris and her dog, one of the best of his child portraits, holds the centre place on the walls, and would be always welcome. This room contains two noble landscapes, John Linnell's "Arcadian Shepherds" (39) and Crome's "Preston Tower on the Orwell" (45); in the latter a mass of foliage fills the centre of the composition, backed by a warm coloured cloud which combines with it in the composition and forms a kind of radiance around the dark trees. Constable's two small Hampstead Heath pictures (48, 49) are dull and heavy, and seem perfunctorily painted; the more so by contrast with Stark's "Rabbiting, near Cromer" (51), a masterly bit of landscape-painting, and so true to the character of that part of the country. Turner's "Rouen" (56) has suffered so much from decay that it is difficult to estimate what might have been its original charms; the "Venice" (60), one of the works in his well-known later Venetian style, is in a good state, and is a good example of this fascinating but rather conventional phase of his art. Besides Stark and Crome, another of the Norwich school, George Vincent, shows well in his "Greenwich Hospital" picture (54), and a small Bonington, "On the Coast of Normandy" (38), is an excellent example of the charm of composition and sky effect which are never absent from Bonington's work; it is somewhat of a conventional style—a suggestion of picture-making in it, but it is so admirably done that criticism is disarmed. In this case Bonington's peculiar delicacy and brightness is intensified by the small work being next to Linnell's dark and richly coloured landscape before mentioned. Among pictures of another class Landseer's "The Cat's paw" (50) shows a most brilliant and forcible piece of animal-painting; and two small pictures by Wilkie, "The Errrand Boy" (37) and "The Rabbit on the Wall" (68), hung as pendants, are worth special attention as illustrating the care which Wilkie took over detail in subjects of this class, before his Spanish trip had unfortunately turned his attention from a class of subjects in which he really excelled to one which was foreign to his genius. In "The Rabbit," notice the contrast between the easy delight of the small spectators and the careful and serious face of the operator intent on producing his effect; it is a piece of real humour worked out with the greatest delicacy of handling, and no accessory detail of the scene is slurred over or neglected.

In the large gallery unquestionably the most remarkable work in the room is neither the large crude portrait group by Franz Hals (102), nor the large and monumental portrait of Dr. John Ash by Reynolds (73), nor yet the Vandyck portrait (83) at the opposite end of the room, but a small portrait by Gainsborough of Giardini the violinist (78), who was also an eminent composer in his day, though this fact is not mentioned in the catalogue note. There is not a portrait in the exhibition so original, so refined, so full of character and expression as this. Among the other portraits in the room Reynolds's of a little boy playing a drum (74) is noticeable for its fine colour. Hoppner's "The Sisters" (79) is effective but somewhat melodramatic; Reynolds's well-known "Venus and Piping Boy" (81), which we have always held to be a very fine design, is unfortunately so much decayed that it is difficult to realise what the effect of colour and texture may have been when it was fresh. Reynolds's "Miss McGill" (89), Hoppner's "Miss Palmer" (90), and Opie's "Master Impey" (94), otherwise known as "the boy in brown," are all interesting works, the last named especially. The large picture of "St. Sebastian" (97) is interesting because it is Vandyck's, and because it is rare to find him in this class of subject, but it serves rather to emphasise the fact that his real field of success lay in portraiture. Among landscapes there is a fine early Turner sea-piece, "The Pilot Boat" (77), with a much better sea than he painted in later life, and a large and rather prosaic landscape by the same artist, called "Classical Composition: Temple of Jupiter" (83), which, except for the fine treatment of the distance, looks a good deal like a stage effect; what temple of Jupiter is meant we know not; the ruin, with Doric columns, rather suggests an inaccurate representation of the Parthenon. Gainsborough's "The Woodcutter's Home" (95) is a landscape worth note for its beautiful composition; the concentration of the main group of figures at the left, and the way in which the figure of the woodcutter seems to connect them, as it were, with the distant perspective of the landscape from which he is returning, make it an admirable example of the manner of placing figures in a landscape so as to assist its effect and expression. That the same artist should have painted this landscape

and the Giardini portrait is a remarkable testimony to the versatility of Gainsborough's genius. Collins's large work, "The Harvest Shower" (75), is a fine example of a school of landscape-painting in which composition went for more than colour or truth to detail; while George Vincent's "Landscape" (71) shows how superior the Norwich school were to their contemporaries elsewhere in painstaking study of nature. Vincent's picture may be thought a little hard, but the careful way in which the mass of trees in the centre is painted, and the attention given to the distance, form a marked contrast to the generalities of Collins; no one would guess, from comparing these two works, that the two painters were nearly contemporary,* and these two pictures very likely painted about the same time.

Gallery V. offers some striking warnings in the way of works by artists once generally accepted as "eminent"; how do their productions show in the light of the present day? The room contains however one really fine picture, "Running Water" (140), a large painting of a river in spate by G. Paul Chambers, a painter little remembered now; but this is a really fine and powerful work. There is also to be seen Millais' portrait of Mr. Hook, one of the finest of his works of this class.

There are some fine things scattered about in the water-colour room, including three perfect little works by Frederick Walker (Nos. 225, 226, and 235), on the screen; a very fine visionary landscape by Samuel Palmer (162); a beautiful "Composition" in landscape (173) by De Wint; Boyce's "Smithfield, 1867" (196); A. W. Hunt's fine stormy picture called "Blue Lights, Tynemouth Pier" (199); two fine Alpine scenes by Turner (208, 211); and a David Cox—"Ulverstone Sands" (215), which is typical of the artist's best work.

The Black and White room contains the studies and drawings by G. F. Watts which he bequeathed to the Royal Academy; mostly outline studies of figures on brown paper, including also studies of drapery and first sketches for the composition of pictures. The rapid outline studies of different attitudes or different points of view of the same model are instructive; they show how the painter studied the outline and pose of the figure; there is no finish and no shading, only the lines that were needed to fix on the mind the action or outline of the figure. This collection of sketches will be of great interest to art-students.

* Collins born 1788, died 1847; Vincent born 1796, died some time after 1830.

NOTES ON OLD LONDON.

THE THAMES-SIDE BETWEEN CHARING CROSS AND BLACKFRIARS BRIDGES; HUNGERFORD, CHARING CROSS RAILWAY, AND WATERLOO BRIDGES; VICTORIA-EMBANKMENT: 1801-1900.

Hungerford Market.—The site of Charing Cross Station and Hotel was occupied *temp.* Charles II. by Sir Edward Hungerford's house and gardens, converted for market uses under a charter of 1679. An Act of 1685 provided for the sale of general produce, Sir Stephen Fox and Sir Christopher Wren at that time sharing the profits. From them the market passed to one Wise, whose successors sold it in 1824-5 to a company, reconstituted under an Act of 1830, for 110,000*l.* The old premises, consisting of booths and shops, with a colonnade about a central hall, stood at the end of Hungerford-street (163 ft. long), and were traversed by a much-frequented footway—Craven-court, now Craven-passage and the archway under the railway-station. The new buildings, erected upon an incline, were opened on July 2, 1833. They were designed by Charles Fowler, architect also in 1829-30 of Covent Garden Market (see Plate II.). His signed plan of February 21, 1833, shows the site as lying between Charles-court, north-east, and Brewer's-yard, or lane, at Nos. 15 and 17, Strand, south-west, with Craven-court leading from Craven-street to the "great hall," and Hungerford-arcade leading from the "upper area" into Villiers-street. Fowler's elevations, etc., are illustrated in the (old) *Architectural Magazine* of April, 1834. The buildings, constructed of granite and stuccoed brick, extended 475 ft. from the end of Hungerford-street, and had a frontage of 126 ft. to the Thames. The plan comprised a spacious hall between two quadrangles—the upper and lower "areas." The northern area, 140 ft. by 70 ft., in the clear of the Doric colonnades, had twelve shops for meat and produce, with living-rooms on two stories above, along its two sides, and entrances opposite the arcade and Craven-court. Between that quadrangle and the hall was a portico or corridor, with stairs at the ends leading up to galleries above the shops on the sides of the hall and down to the cellars. On the two sides of the hall, 188 ft. by 123 ft., were shops for poultry, meat, and produce; a flight of steps descended to Craven-court The roof of the middle aisle of the hall was raised upon open arches above the roofs of the two side aisles. A portico or corridor lay at the lower end of the hall, separated from it, as at the upper end, by an open arched screen. Stairs from the corridor gave access to galleries above, and to the fish-market and the vaulted cellars on two tiers beneath, with a prospect tower over each staircase. The level of the southern area, 120 ft. by 70 ft., lay one floor lower; a wide range of steps descended from its upper end to the fish-market, 120 ft. by 70 ft. The river-front consisted of a double colonnade having a terrace above, flanked by the Dolphin (east) and Swan (west) taverns, which had flat roofs planted as gardens. The proprietors bought more ground, and, embanking the deep bay of the shore, built a quay and jetty. From the wharf, 95 ft. by 218 ft., granite steps communicated with the jetty, which projected 250 ft. into the river. From the wharf to Villiers-street extended a large open space for the hay-market; the sailing barges laden with hay formed a pleasing element of the view. On the northern wall of the old market-house was a bust of Sir Edward Hungerford (Plate II.), wearing his 500-guinea wig, over a tablet inscribed:—

"FORVM VTILITATI publicæ perquam necessarium REGIA CAROLI 2i annuente MAJESTATE proprijs Sumptibus erexit perfecitq D. EDVARDVS HVNGERFORD Balnei Miles ANNO MDCLXXXIII."

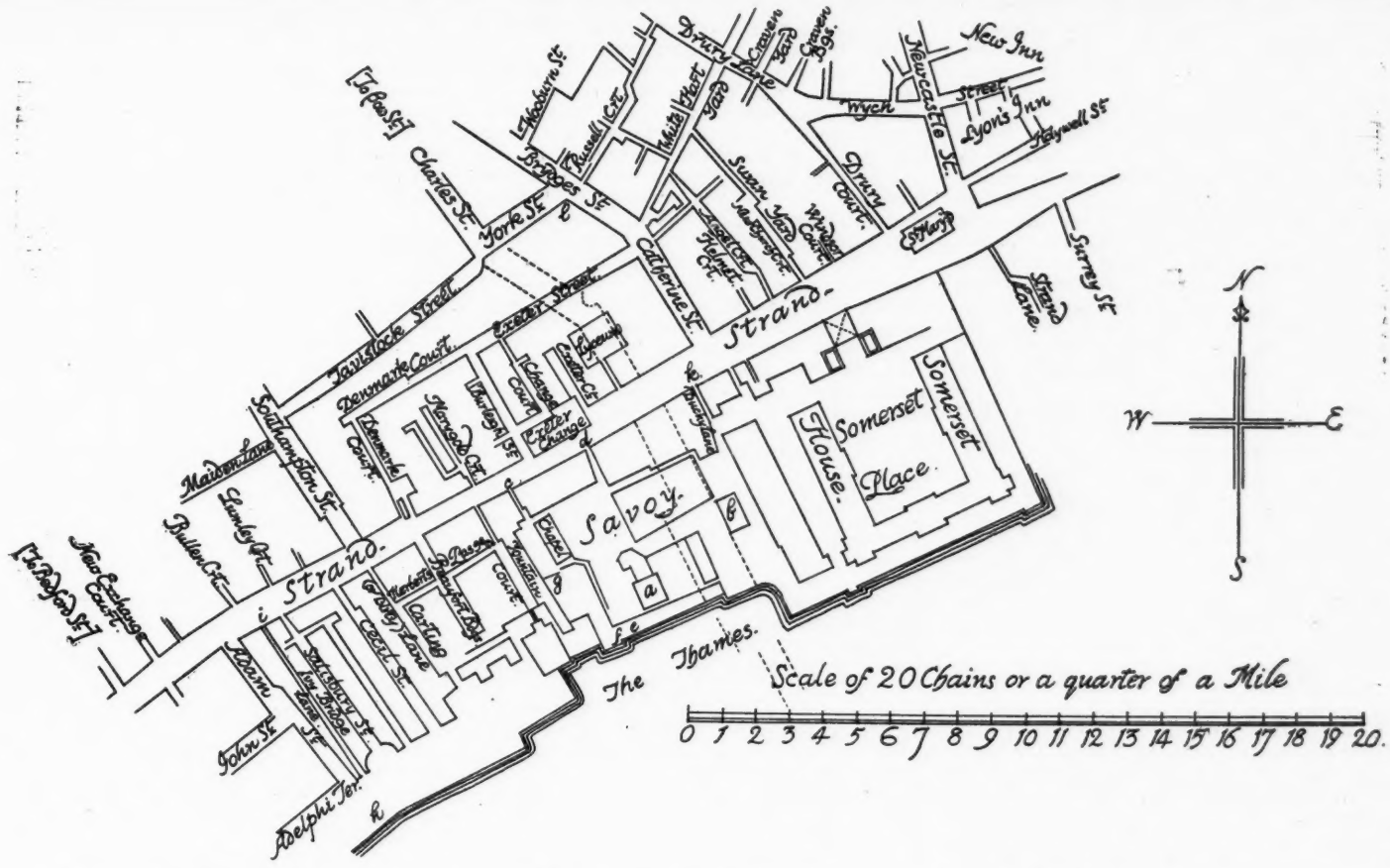
That house, in the XVIIth and XVIIIth centuries a French church, was latterly tenanted by the British Fire Office and a dairy. For Charles Dickens's boyhood in No. 30, Hungerford-street, and the market, *vide* "David Copperfield."

York-buildings and the Water Gate.—An Act of May 15, 1624 assigned in exchange to James I. the "inn" of the Archbishops of York, which had been that of the Bishops of Norwich. He bestowed it upon George Villiers, Duke of Buckingham, who pulled down the house and built some reception-rooms in its stead. For his intended mansion he built the Water Gate, which remains in a hollow of the Embankment-gardens. The gate, bearing his cognisance, a foul anchor, as Lord High Admiral, was executed by Nicholas Stone after a design generally ascribed to Inigo Jones [September 19, 1896, Mr. W. R. Mosley's measured drawings]* Under their London Open Spaces Act, 1893, the London County Council acquired Villiers-walk (since York-terrace) and the water-gate; they planted the walk, repaired and underpinned the gate, and roofed it with lead. On May 12, 1888, Mr. Justice Chitty made an order for winding-up a long-forgotten enterprise named the Lessee Proprietors of the York-buildings Waterworks. Ralph Bucknall and Ralph Waine obtained licence under the Great Seal in 1675 "to erect a waterwork on the grounds of York House"—being their own land. An Act of 2 & 3 Will. and Mary incorporated "the Governor and Company of Undertakers for raising Thames's water in York Buildings." The proprietors sold their venture in 1719 for 7,000*l.* In 1812 a sum of 30,000*l.* was expended upon a new engine-house, the substitution of iron mains for the wooden pipes, and an enlarged conduit to the reservoir beneath Villiers-street. By indenture of September 16, 1818, the New River Company acquired the undertaking, and covenanted to make certain annual payments, including four annuities of 500*l.* apiece to terminate in June, 1911. An Act of 1829 dissolved the corporation. The works fed a reservoir in Marylebone-fields for supplying the western parts of the town; the number of houses never exceeded about 2,700. Savery constructed the engine, known as the York-buildings dragon, copying the parts, doubled in each dimension, of one he had made in 1712 for a Mr. Balle at Campden Hill, Kensington: confer R. Bradley's "Ten Practical Discourses, etc.," 1727-33. Savery's machine forced 3 tons of water per minute into a leaden cistern at the top of a wooden tower, about 65 ft. high and octagonal on plan (see Plate I.). It is the "noble engine" described by Switzer in his "Hydrostatics and Hydraulics," 1729; De La Motraye gives a view, 1735, of Savery's engine and its successor, Newcomen's beam-engine, side by side. The fuel proved to be costly, the plant often became disabled, and the sea-coal smoke caused great annoyance in the neighbourhood. Savery's engine, disused in 1731, was preserved there during a long time as a curiosity. The water-tower, upon a projecting wharf (latterly the site of Charing Cross Music-hall) midway between the end of Villiers-street and Black Lion-stairs at the foot of Charles-court, survived much longer. There are views of it in the National and Guildhall Collections, and a water-colour drawing of the tower and the gate in the Turner Collection at the National Gallery; see also Samuel Scott's picture of the river-side bought in 1891 for the National Gallery. Of the two houses at the south end of Buckingham-street (1675), No. 14, at the western corner has been rebuilt, as clearly appears from a painting of the riverside, in or about 1756, by W. James, which is now, or was lately, in the Queen's Presence Chamber, Hampton Court Palace. The former house, of red brick, on that site—depicted by James—had been the residence of Pepys in 1684-1700, and then, *teste* Hatton in his "New View," 1708, of Ralph, first Duke of Montagu, Master of the Royal Wardrobe. The present house was the home of Clarkson Stanfield, R.A., and, in 1826-49, of William Etty, R.A. In 1689 Pepys had the Tsar Peter the Great for his opposite neighbour at No. 15, still extant, and a former home of the Institution of Civil Engineers, and of W. Black, the novelist, *vide* his "Sunrise." George-street and Of-alley are renamed York-buildings and York-place.

The Adelphi.—As the story of the Adelphi is told and illustrated in the *Builder* of December 6, 1902, there needs to say only that the once notorious "Arches" are now cleansed, guarded, and lighted, and to cite the fine perspective drawing of "the Royal Terras . . . with the wharfs, arcade, and entrances to the subterraneous streets . . ." engraved by B. Pastorini, in the third (and posthumous) volume, 1822, of "Works in Architecture by Robert and James Adam." David Turner's water-colour drawing in the "Crowle" Pennant depicts the "sea-water house" at the west end of the wharf. In 1818 some sea-water baths were in Buckingham-street; and there were some at No. 21, St. George-street.

The Salisbury Estate and Hotel Cecil.—Under the enabling provisions of the Settled Estates Acts, the late Marquis of Salisbury sold his property lying between the Strand and the former riverside in 1887 for, it is said, 200,000*l.* J. W. Hobbs & Co. subsequently acquired the freehold, purposing to lay out a curved road, to rise to 35 ft. above the embankment level, to the Strand at Wellington-street. That project gave way to Messrs. Perry & Reed's plans for covering the area, nearly 2¼ acres, with a vast hotel. Traversed by Ivy Bridge-lane at No. 76, Strand, and by Salisbury and Cecil streets, the ground embraced a strip of land adjoining the Embankment gardens, whereon, at the foot of the lane, remained until the winter of 1888-9 an old messuage which, fifty-five years ago, was known as the Fox-under-the-Hill, whence at Salisbury-stairs the half-penny steamboats, *Ant*, *Bee*, and *Cricket*, plied to London Bridge. The traffic ceased after the disastrous explosion of the boilers of the *Cricket*, which killed six persons and injured many more. The lane was then closed by a gate at the Strand end, though for several years afterwards it could be ascended from the Thames side. The upper

* Dates within *square* brackets relate to illustrations in the *Builder*. For Stone's share in the work, and the *data* upon which its design might be claimed for him, see the *Builder* also of May 13, 1854; June 18, 1864; May 26, 1888; and September 19-26, 1896. Some say that Sir Balthazar Gerbier was the Duke's architect.



a. Old German Lutheran Church.
b. French Church.
c. Little Savoy-gate (Savoy-steps).
d. Middle Savoy-gate (Savoy-street).
e. Site of German Calvinist Church.
f. Site of Savoy Water-gate.
g. Military Prison.
h. Fox-under-the-Hill.
i. Site of Ivy Bridge.
k. Site of Strand Bridge.
l. Former Offices of the *Builder* (1842-1873).

Fig. 1. *The Savoy before the Building of Waterloo Bridge and Wellington-street.*

end, now a passage to the hotel, marks the position of Ivy Bridge, formerly Ulle-brig, in the Strand, across a rivulet flowing from Cock and Pye fields, near Seven Dials. Stow records :—

"Ivie bridge in the high street, which had a way under it leading down to the Thames, the like as some time had the Strand bridge [see under Savoy], is now taken down, but the lane remaineth as afore, or better, and parteth the liberty of the Duchy and the City of Westminster on that south side."

The lane under the bridge formed a frequented thoroughfare for foot traffic between Covent Garden and the waterside; across its lower end projected, until lately, the west half of the crescent circus which, together with the retaining wall and the flight of steps descending 24 ft. to near Salisbury-stairs, the brothers Adam added to Salisbury-street, rebuilt in or about 1783 by James Payne. Ivy Bridge-lane, overlooked by the back bay-windows of houses along the west side of Salisbury-street, presented a singular appearance, being covered for the greater part of its length by portions of houses on both sides, which darkened the way and converted it into an almost continuous tunnel, square in section. The entrance at No. 76, Strand, was incorporated in 1893 in the front of the Club Café by Mr. P. E. Pilditch, since pulled down. Many of the earlier Cecils were buried in the old church of St. Martin-in-the-Fields. The registers contain an entry of a payment of 3s. 4d., in 1630, to William Wright :—

"for a stone ingravd with letters on it which is sett in the wall of the Earl of Salisbury at his house at Ivie Bridge to devide the two parishes of St. Martin in the fields and St. Clement Danes at that place."

Sir Robert Cecil, advanced Earl of Salisbury on May 4, 1605, built a mansion on the west side of the gardens of the Bishop of Carlisle's "inn"—since Russell, or Bedford, House, and then Worcester House; Queen Elizabeth was present at the house-warming on December 6, 1602. William, second Earl, subdivided the mansion into Great Salisbury House and Little Salisbury House, reserving the former for himself, and renting the latter to his son-in-law, William Cavendish, third Earl of Devonshire, and other persons of quality. In 1692 the site of Little Salisbury House was leased for the making of Salisbury-street, since altered by the brothers Adam, and by Payne, as already mentioned. Another parcel of the estate was leased for a range of shops, the Middle Exchange, which extended from the Strand to the river bridge or stairs. Having proved to be a failure the Middle Exchange was, together with what remained of Salisbury House, demolished in 1695, and their site was taken for Cecil-street, whereof the east side lay within the Savoy precinct, abutting against Carting, formerly Dirty, lane, at No. 88, Strand, by the side, in later times, of the Savoy Theatre. Looking down Salisbury-street (closed in May, 1892), one saw the obelisk on the Embankment. Of the hotel, opened in 1896, the southern block, abutting on Savoy-place, was built by J. W. Hobbs & Co., and the eastern and western blocks by Messrs. Perry & Co., after Messrs. Perry & Reed's plans and designs—all the metal work being calculated for and supervised by Professor A. B. Kennedy [October 20, 1888, with section and two plans; October 19, 1895, Strand façade, grand staircase, and two plans]; the three blocks stood around a courtyard, 300 ft. by 80 ft. The plans illustrated in the *Builder* were modified on the demolition in 1898-9 of Nos. 76-7-8, Strand, between Ivy Bridge and Carting lanes, together with the northern ends of Salisbury and Cecil streets which had formed the two entrances into the courtyard, and on the setting back of the frontage so as to widen the Strand there to 80 ft. Mr. J. Carmichael built the extension to the Strand, comprising shops, offices, and Cecil-chambers, after Mr. Joseph Sawyer's designs.

Savoy Hotel.—In June, 1889, a company was formed to take over Beaufort House at the south end of Beaufort-buildings, Strand, and the nearly completed hotel erected by Mr. G. Holloway, who, we understand, acted as "working master builder," no professional architect having been employed. The south front, with its heavy iron verandahs, is incommensurate with its position, and perhaps the best one could say for it is that it gains by contrast with the adjacent Examination Hall. A special feature of the rearrangements consisted of numerous self-contained suites on every floor, and a central courtyard, 6,006 ft. superficial, treated after the Continental manner. The decorations, by Messrs. Collinson & Lock, of the restaurant, reception-rooms, etc., are from drawings by Mr. T. E. Collcutt, who also made special designs for the mantelpieces throughout. Some additions to the courtyard, by Mr. T. E. Collcutt, are illustrated in the *Builder* of July 11, 1896. The more recent extension, embracing the Strand front, with "Simpson's" (1848), were made by Messrs. Collcutt & Hamp, in association with the Worcester Buildings Company, and in connexion with the widening of the Strand by the Westminster City Council. The new entrance, Savoy-court, having a raised level, absorbs Beaufort-buildings and Herbert's-passage; the façade supplants Nos. 89-104, Strand, between Carting-lane and Savoy-buildings leading to Fountain-court and the Savoy. Of Fountain-court the remaining (west) side was pulled down in 1902, and with it No. 3, the home, during the last seven years of his life, of William Blake, who lodged in the back room on the first floor, and died there on August 12, 1827, drawing with a final effort a likeness of Katharine Boucher, his wife. Opposite, on the east side of the court, stood the Occidental tavern, reputedly more than 270 years old, and of high standing during the Regency, but after 1851 known as the Coal Hole, the *soi-distant* Chief Baron Nicholson's, which, with the adjoining Nos. 13-4, suddenly collapsed on the morning of March 26, 1887, after they had been dismantled for the building of Terry's Theatre [Mr. Walter Emden, April 9, 1887].

The Savoy.—The Court Leet of the Royal Manor and Liberty of the Savoy has existed during longer than 700 years, and is charged with maintaining the boundary marks in the Hotel Cecil, at the Lyceum, Child & Co.'s Bank, Twining's tea warehouse in Devereux-court, the Embankment, and other places. The jurisdiction extends from the Hotel Cecil to the Middle Temple, taking in the north side of the Strand, the south side of Holywell-street (now pulled down), and the Lyceum and (old) Gaiety theatres. Of the former buildings a fragment of stone wall, by the wharf, survived until 1877 at the south-east corner of Savoy-street. The Hospital of St. John the Baptist, erected by Henry VII. and Henry VIII., and built by Humphrey Cook, the "King's carpenter," with, at its east end, Charles II.'s French

Protestant Church of St. John the Evangelist (1661), first founded in 1641 by B. de Rohan, Lord of Soubise, lay between the Chapel Royal and Duchy-lane. Duchy-lane, or place, or court, opposite the site of Strand bridge, was entered by a steep flight of steps between Nos. 137-8, Strand, and is absorbed by a recent widening and rebuilding, at the corner, east, of Wellington-street. A valuable set of (undated) drawings by Sir William Chambers and Robinson in the Soane Museum contains plans and designs for proposed public offices on the Savoy site, after the style of Somerset House, with plans of the old hospital and adjacent buildings. The latter plans plot the "coach-passage" shown in Vertue's earlier plan of 1736, leading from the Broadway to the Friary, which had been cut obliquely through the nave, or western arm, of the cruciform hospital, all of which was then occupied as soldiers' barracks. At the north end of the Broadway was Middle Savoy-gate; Savoy-street, formerly Great Savoy-hill, has replaced the Broadway and coach-passage, Wellington-street and Lancaster-place traverse the sites of the Friary, the eastern part of the hospital, and the French Church. The military prison at the south-west angle of the Chapel Royal faced Little Savoy-gate—now Savoy-steps, at Nos. 107-8, Strand. Savoy-mansions are on the site of the prison and of the western portion of the barracks. The Medical Examination Hall marks the position of the German Calvinistic Church on the east side of the river stairs, and of the (old) German Lutheran Church between the Calvinistic Church and the Friary. The Lutheran Church, rebuilt on adjacent ground, was pulled down for the widening of Savoy-street; the French Church was rebuilt in Bloomsbury-street (now Shaftesbury-avenue). On succeeding to the throne Queen Elizabeth converted the hospital chapel (1503-5) into a parish church, for the parishioners of St. Mary-le-Strand, which, by letters patent of November 27, 1773, became a Chapel Royal. George IV. repaired and improved the chapel in 1826-30; in 1843 Sydney Smirke the elder, surveyor-general to the Duchy of Lancaster (*ob.* 1877), restored the fabric for Queen Victoria, Willement designed the glass for the window above the reredos, and restored the reredos, by some ascribed to Sir Reginald Bray, and the roof and ceiling. Smirke altered the interior in 1860, removing the gallery and fitting in a new organ. A fire, which broke out in the rear of a house in the Strand on Thursday afternoon, July 7, 1864, destroyed nearly all but the walls, the roof, and the beautiful ceiling of oak and pear wood, divided into 138 enriched quatre-foil panels. Smirke reinstated the chapel at a cost of 7,000*l.*, defrayed by the Queen. Messrs. Perry & Reed added a porch and vestry in 1877; the schools, with the Royal Savoy clubroom [Messrs. Perry & Reed, May 5, 1883], were built for Queen Victoria by Mr. W. Brass. The Sovereign's ecclesiastical authority is supreme in the precinct, and all the buildings are exempted from the district surveyor's supervision and the provisions of the London Building Acts. In 1875 the late Metropolitan Board of Works obtained powers (38-9 Vict. c. 179) to make a road (Savoy-hill) through lands belonging to the Queen in right of her Duchy of Lancaster, and one (Savoy-place) through their vacant lands to the east boundary of Lord Salisbury's property at the south end of Carting-lane. The Act further empowered the Chancellor and the Council of the Duchy to widen Savoy-street by setting back the graveyard railing and the return of No. 115, Strand, and by taking in nearly all the site of the later Lutheran Church on the west side. The improvement, completed in March, 1877, cost 3,689*l.*, the Board not being required to pay for the land thus thrown into the public way. The Turkish baths at the lower end were fitted after the Moorish mode by C. J. Phipps (*ob.* 1897), architect (1881) of the Savoy Theatre, the first London theatre lighted with electricity.

Somerset House and King's College.—Mr. W. Monk's drawing [January 4, 1902] of the south front of Somerset House, as it appeared before the making of the embankment, evinces how the raised embankment, with its land-side balustrade, has spoiled the effect of the terrace arcade rising directly from the water at full tide. The plinth course of the arches and of the side watergates is now concealed, whilst the solemn gloom of the great middle arch which is blocked up to above the springing is quite destroyed by a wall inserted almost flush with its face for the conversion of the archway into rooms, with a door and windows in the wall. A stone wall and repository (1897) at the west end of the river front replaced the Dock House, a waterway for barges leading to Somerset-place, or West-court. Sir James Pennethorne completed Chambers's design with the west block opposite Lancaster-place in 1852-3. For his successful work on that occasion seventy-five leading architects presented him with a gold medal. One day, as he crossed Waterloo Bridge with a friend, Telford pointed to the corner of the river front, saying: "Forty years ago I hewed and laid those stones when I worked on that building as a common mason." King's College was established in 1828; the buildings are by Sir Robert Smirke, 1830-1. The Government granted a parcel of vacant land on the east side of Somerset House, stipulating that the river front should be in keeping with that of the latter. But additions carried out in yellow brick on that side spoil the continuity of the two designs. The chapel over the hall and projecting eastwards is by Sir G. G. Scott. In 1897 the school migrated from the basement and the north wing to new buildings at South Hayes, Wimbledon; in 1900 Messrs. Banister Fletcher & Sons built an additional story on the south wing, and reconstructed the second story of the north wing for laboratories, the museum, and the architectural, geological, and other scientifical departments [November 3, 1900].

Whitefriars and Bridewell Precincts.—The Carmelite convent founded by Sir Richard Gray, 1241, stood between Inner Temple and Water-lane—now Whitefriars-street. Crocker's, or Brocker's, lane, granted to the Friars for building their church, 1407, is now Lombard-street; Hutton-street supplants the notorious Wilderness-lane. In the *Builder* of November 16, 1895, is an account of the discovery of the crypt at No. 4, Britton's-court. Of "Alsatia" in the early years of the XVIIth century a graphic description is given by Sir Walter Scott in his "Fortunes of Nigel." The *Gazette à la mode, or Tom Brown's Ghost*, No. 3, of May 26, 1709, records the demolition of the Dorset Gardens Theatre (1671, by Wren) in that year when the New River Company took the ground for their timber-wharf, pipe-boring shops, offices, etc.; the City of London Gas Company established their works in 1814 on the site, which is now that of the City of London School. An excavation, in 1892, on the site of Bridewell Palace (*see* Plate II.), behind De Keyser's Royal Hotel, revealed a pointed arch built upon piles, and some walling carried by red brick arches with chalk abutments resting on elm piles. G. P. Boyce's drawings of St. Edward's Chapel and the adjacent buildings were deposited in the Museum, South Kensington. In the Guildhall is a picture, by Samuel Scott, of Bridewell dock, 1770, with Dr. Sacheverel's house distinguished by a mural sun-dial. The old burial-ground is in Dorset-street. The remaining buildings comprise the court-room, offices of Bridewell and Bethlehem Hospitals, and treasurer's residence. An Act of 52 Geo. III. provided that a portion of the old hospital and house of correction should be available for the detention of refractory apprentices; some cells remain, and they are still used upon occasion. The prison was pulled down in 1863-4; the chapel—where is now Bridewell-place—in 1871.

Hungerford and Charing Cross Bridges.—I. K. Brunel's suspension bridge [April 12, 1845] was erected by Sandys, Carne, & Vivian, of Cornwall, who contracted for some 15,000 tons of ironwork, and by W. Chadwick, who built the abutments and the two piers and their towers, after designs by Bunning (*ob.* 1863), in the Italian style, to harmonise with the façade of the market, where the bridge joined the terrace roof of the central colonnade. Brunel (*ob.* 1859) built the brick piers upon the gravel, without piles, adopting the coffer-dam principle after the old form. The piers, whose bases remain, carried rectangular towers, 22 ft. square on plan. The 14-ft. footway, having iron diagonal trusses to minimise undulation, hung by single suspension rods, 12 ft. apart, from four chains, in two lines, composed of 2,600 links weighing in all 750 tons; each link being 7 in. wide, 1 in. thick, 24 ft. long, and weighing 5½ cwt. The chains passed over rollers on the towers, the saddles having a free movement of 18 in. each way, and were secured in tunnels at the abutments to two iron girders, 44 ft. long and 5 ft. deep, solidly embedded in the brickwork in cement backed with concrete. The towers rose to a total height of 80 ft., or 58 ft. above the footway; the deflection of the chains

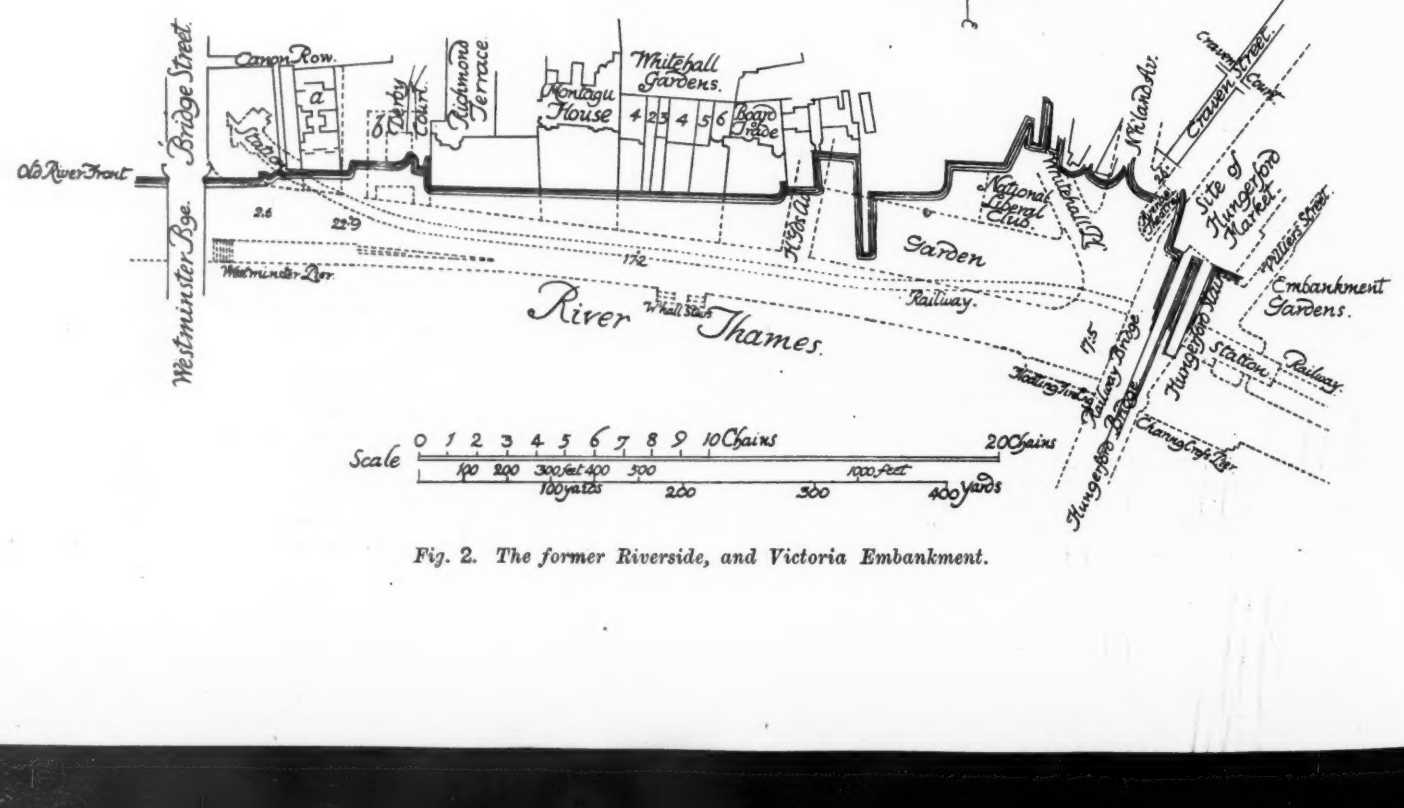


Fig. 2. The former Riverside, and Victoria Embankment.

amounted to 50 ft., their entire weight and that of the platform were thrown on to the columns and not the arches of the piers. The middle span, 676½ ft., was 116½ ft. more than that of the Menai Straits bridge, and second to only that (nearly 900 ft.) of Chaley's similar bridge at Fribourg, in Switzerland, each of the two other spans was 333 ft. The footway was 22½ ft. at the abutments, 28½ ft. at the piers, and 32½ ft. at the middle point, above high-water mark, giving a graceful camber, rising to 7 ft. higher than the crown of the middle arch of Waterloo Bridge; each pier had flights of steps descending to the river. Begun in the spring of 1841, and costing a total sum of 110,000*l.*, Hungerford Bridge was opened on May 1, 1845; the halfpenny tolls yielded a fair dividend to the proprietors. Under their Act of 1861 the South-Eastern Railway Company obtained powers to extend their line from London Bridge Station (Surrey side) to termini at Cannon-street and Charing Cross. The chains of Hungerford Bridge were taken for the completion, by J. Hawkshaw and W. H. Barlow (*ob.* 1902) of the suspension bridge [August 8, 1863] across the Avon at Clifton, which I. K. Brunel had designed many years previously. They were adapted to the span there of 702¼ ft., with a deflection of 70 ft. Harrison Hayter, C.E. (*ob.* 1898), designed the iron railway bridge, with footpaths on cantilevers, supplementing the two brick piers with iron cylinders. For sinking the cylinders he discarded the compressed-air method, employing divers, who worked inside until the cylinders had reached the clay to a maximum depth of 32 ft. in the river bed, when they were pumped dry. The shallower piers he sank 25 ft., the piles for the greater part penetrating the stiff London clay, with beds of septaria—confer the *Proceedings* of the Institution of Civil Engineers, vol. 49. The Metropolitan Board of Works opened the bridge toll-free on October 5, 1878, paying 98,540*l.* compensation to the railway company. In 1884-5 Mr. Brady, engineer to the South-Eastern, since the South-Eastern and Chatham, Railway, widened the bridge by 40 ft. on the upstream side for four more lines, Messrs. J. Cochrane & Sons being the contractors. The terminus was opened on January 11, 1863; the hotel, built by Messrs. Lucas, at a cost of about 130,000*l.*, is by E. M. Barry (*ob.* 1880), who also made the designs for the copy, in the forecourt, 1863-5, of the Queen Eleanor Cross, at Charing. On December 23 last we published a description, with drawings, of the station and roof designed by Sir J. Hawkshaw.

Waterloo Bridge.—For a company formed in 1809 Ralph Dodd, the projector, aided by John Linnell Bond, prepared designs for a horizontal bridge, having elliptical arches, which they based upon those of Jean R. Perronet for the bridge (1768-74) across the Seine at Neuilly; the Act of 1809 (49 Geo. III. c. 191) names Bond as "assistant architect." The designs were referred to John Rennie and Jessop; the company appointed Rennie as their engineer. Of his two designs—one for seven, the other for nine, equal arches—they chose the latter as the less costly. Rennie followed the model of his bridge across the Tweed at Kelso (1799-1803), having five semi-elliptical arches of 72 ft. span, with engaged Doric columns on the piers and abutments, a plain block cornice, and a balustrade, and a level roadway. The nine arches have a span of 120 ft., their crowns are 30 ft. above high water at ordinary spring tides; the arch stones increase regularly from 4 ft. 6 in. at the crown to 10 ft. in depth at the haunches—a correctness of principle which Rennie was the first engineer to adopt. The piers decrease in width from 30 ft. at the foundations to 20 ft. at the springing of the arches, and the abutments similarly decrease from 40 ft. at the base to 30 ft. at the springing. Over the points of the piers are two three-quarter engaged Grecian Doric columns, designed after those of the temple at Ægesta, in Sicily, each having a diameter of 5 ft. 8½ in. at the base, a height of 23 ft. 9 in., and a width of 4 ft. 4 in. at the under side of the capital, and each pair carrying a recess from the footpath, 17 ft. wide by 5 ft. deep. Between each pair of arches, at a level of 19 ft. above the springing, is an inverted arch, of which the stones are 4 ft. 6 in. deep at the crown, and decrease regularly on each side as they unite and abut against the extrados or backs of the voussoirs of the main arches. A Grecian Doric block cornice and entablature carry a balustrade parapet 5 ft. high. Rennie employed coffer-dams for constructing the foundations of the piers, a then novel expedient in a large tidal river, with an ingenious method of constructing, floating, and fixing the centring [May 28, 1898; sections of arch and pier of Waterloo and London bridges, showing pile foundations and construction of centring—Mr. A. T. Walmisley]. The balustrade was worked at Aberdeen; the rest of the granite was hewn on the Surrey side, and it is recorded that one horse, "Old Jack," drew nearly the whole of the stones to the work. Rennie put the face of the northern abutment in a line with the terrace of Somerset House, and laid out the roadway to be level, as nearly as possible, with the Strand, whence the rise to the top point on the bridge has a gradient rate of 1 in 250, or about 2 ft. in all; the two

(*Continued on page* 19.)

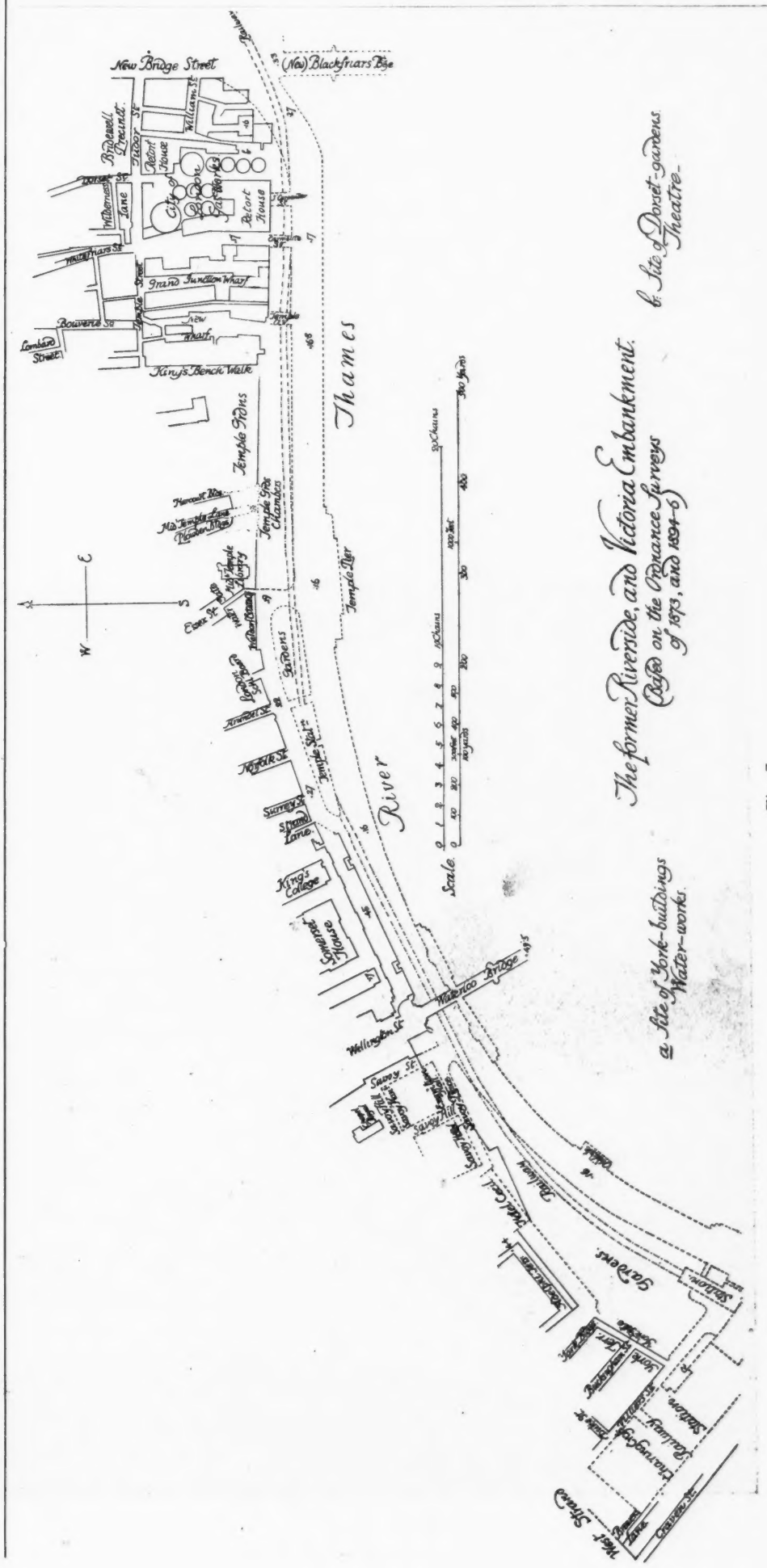


Fig. 3.

Fifty Years Ago.

FROM THE *Builder* OF JANUARY 5, 1856.

THAMES ESPLANADE AND RAILWAY.

A COMPANY has just been registered under the title of the "River Thames Esplanade, Railway, and Sewage Company." The promoter, Mr. Wieland, of Glasgow, proposes to construct river walls on both banks of the Thames, extending from London Bridge to Westminster Bridge, with the view of improving the channel and navigation, while increased wharfage accommodation would be given by means of quays and archways extending inwards from the river a depth of 120 ft. On the north side of the river the quay is to be 40 ft. wide, and 80 ft. in depth from the quay, is to be covered by a double row of groined arches, 35 ft. span, and about 35 ft. in height. It is proposed to raise a road or esplanade on the top of these arches 80 ft. wide, running parallel to the river on the level of the various bridges from London Bridge to Hungerford Market. On the river side of the esplanade is to be a parapet and balustrades, and on the land side a row of handsome shops, warehouses, or offices. Underneath would be a series of warehouses communicating with the quays. On the south side of the river it is proposed to adopt the same plan, with the exception that the esplanade would only be 40 ft. wide, and on the greater portion of it the warehouses above the shops would give way to private dwellings, built in flats, on the Scotch and Parisian plans. The esplanade on either side of the river is to form junctions with the bridges and leading streets. It is also proposed to form an additional railway under the arches of the railway on the Middlesex side of the river from London Bridge to Hungerford Market. Another feature of the scheme is to prevent the pollution of the river Thames by conveying the sewage from the mouths of the present sewers to convenient spots, where it may be deodorised and converted into manure for agricultural purposes. The importance of the object is admitted on all hands—what is wanted is a practicable mode of effecting it, and this the company will have to show by details. The Thames ought to be embanked, and it will be, we have no doubt—it is simply a question of time and the right man.

Illustrations.

PORTION OF ROOF, MILAN CATHEDRAL.

THE Cathedral of Milan is of unknown authorship, as regards the architect, though the design is probably, to a large extent, of German origin. Its wonderful roof, with the crowd of pinnacles, statues, and flying buttresses, makes an intricate study. Many of the sculptures have been over-rated, and some of them are very meagre, as regards any artistic quality; but the effect of intricacy and elaboration of the whole produce a *tout-ensemble* the like of which is nowhere else to be seen. The statues include saints, prophets, prelates, beings, and martyrs; the latest addition to the illustrious company being Napoléon (about 1805).

The upper slopes of the flying buttresses are adorned on each side with a carved cresting, representing different flowers (very crudely cut), from which circumstance the roof has sometimes been known as the "Garden."

The upper part of the second buttress pinnacle to the right has been omitted in the sketch, as cutting out too much of the "Aguglia," or central lantern—a very beautiful feature. A. C. C.

THE NEW WAR OFFICE.

THE new War Office, now completed externally, was, as our readers will probably remember, designed by the late Mr. W. Young, who unhappily died before the building was commenced, and has been carried out by his son, Mr. Clyde Young, with whom is associated Sir John Taylor, as consulting architect on the part of the Office of Works.

The contractors are Messrs. Foster & Dicksee, of Rugby. The whole of the stonework is specially selected Portland stone, which has all been worked at their yard in Chelsea, where they have established a most up-to-date plant for dealing with it, and the result is a most excellent piece of masonry, on which they are to be congratulated. Needless to say, fire-resisting construction has been used throughout, and the danger of fire reduced to a minimum.

We content ourselves for the present with these few particulars. When the building is completed will be the time to give fuller details as to the whole scheme, and the treatment and purposes of the various rooms and other portions of the interior. We give however a plan of one of the floors, which Mr. Young has kindly furnished us with.

The perspective view of the exterior was specially made for this issue by Mr. E. B. Lamb.

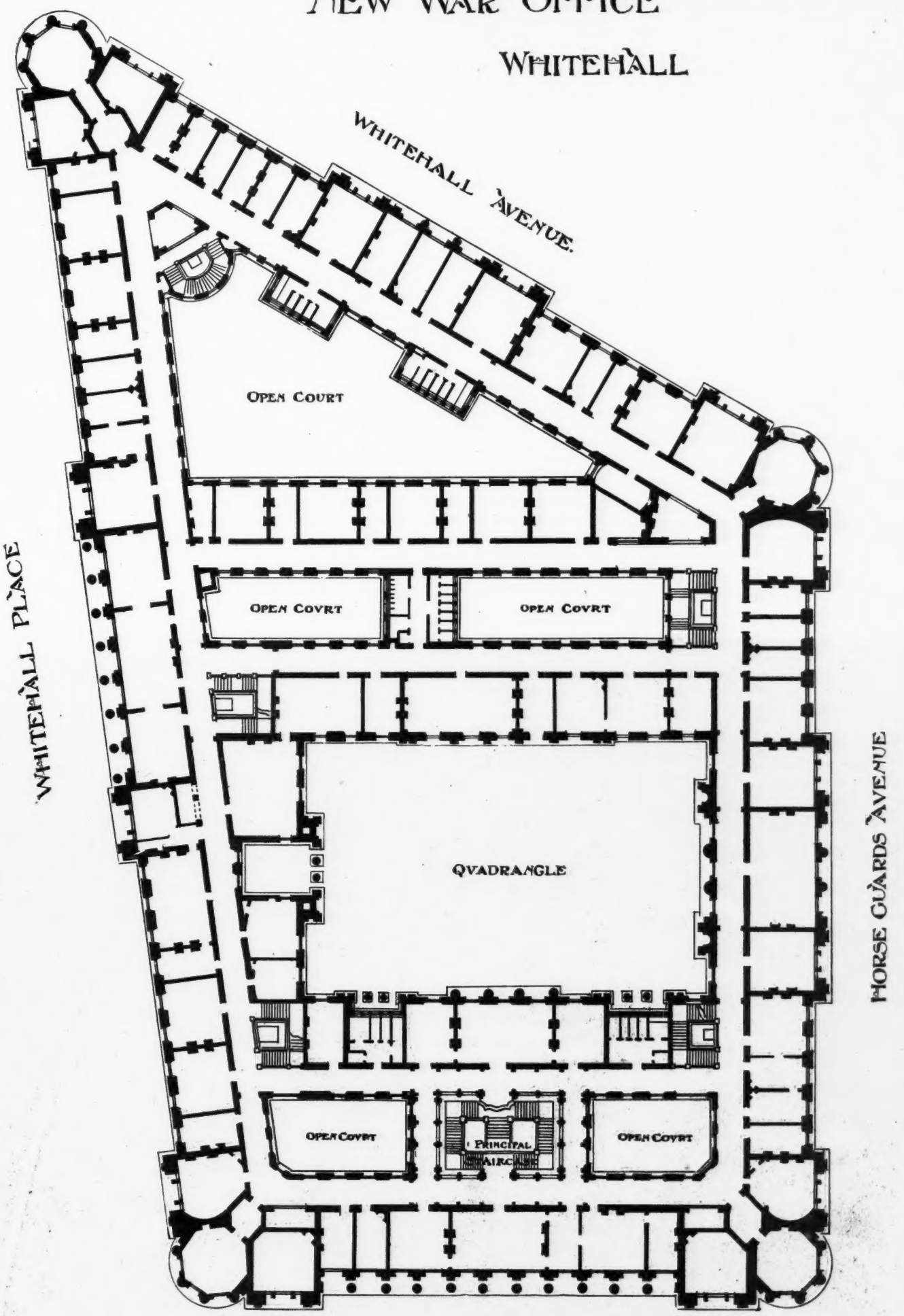
SCULPTURE AT THE NEW WAR OFFICE.

THROUGH the kindness of Mr. Alfred Drury, A.R.A., who has been commissioned to execute the principal groups of decorative sculpture on the exterior of the War Office,

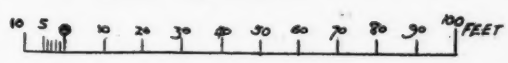
Truth. Justice.

Sculpture Group on the New War Office.

NEW WAR OFFICE



PLAN OF PRINCIPAL FLOOR



we are enabled to give illustrations of six of the figures or groups which occupy positions over the decorative pediments on the face of the building.

We give two of the groups on a small scale, as illustrations in the text, in order to show the manner in which they are arranged and combined in connexion with the line of the pediment and the central stele. One group represents "Truth" and "Justice"; the other, which has "Peace" for its ruling motive, represents on one side one of the sad results of war, "The Fatherless and Widow"; the other, which seems to us a peculiarly charming conception, represents "The Winged Messenger of Peace" bringing the glad tidings.

It is necessary to observe that these photographs, as well as those on a larger scale in the lithograph plates, were made from the models in the sculptor's studio, and therefore are necessarily deprived of the proper architectural adjuncts in the shape of mouldings, etc. On the other hand, there is the advantage that they are taken in a more favourable position than would have been possible after the figures were *in situ* on the building.

The separate plates give the figures or groups already mentioned on a larger scale, and also two figures from a group of which "War" is the motive; the two figures representing respectively "The Horrors of War" and "The Dignity of War," two views of war which are equally true, but are unfortunately often considered apart from each other; the "peace-at-any-price" people seeing only the horrors, and not the necessity which is sometimes unquestionable; while the ultra-military spirit tends to see only the glory of war. The combination of the two ideals in one composition becomes therefore a kind of moral lesson set forth in sculpture.

NEW HOTEL DE VILLE, VERSAILLES.

GOING out to Versailles two years ago, our attention was caught by what was obviously a just completed Hôtel de Ville, standing near the tramway leading up to the great palace, and then in all the bloom of fresh-hewn stone. We made a mental memorandum to have this illustrated, and now give two illustrations from photographs specially taken for the *Builder*.

These district Hôtels de Ville or Mairies (as they are sometimes termed) in the various arrondissements of Paris, are among the most characteristic modern buildings of Paris. There is a considerable family likeness between them in style and in general disposition of parts, which is as it should be, as it is desirable that the Hôtel de Ville of the district should be easily recognisable by its architectural character; in the same way and on the same principle that in London we have seen a distinctive style and treatment adopted for the London School Board schools.

The architect of the Versailles Hôtel de Ville is M. Le Grand, of Paris.

THE RICCARDI PALACE, FLORENCE.

THIS celebrated building, though now known by the name of its later owners the Riccardi, was built by Cosimo di Medici, and was at first the home of their family. Browning makes it the scene of the wedding feast in his remarkable poem "The Statue and the Bust," the heroine of which was

> "A bride the Riccardi brings home to-day."

And in some vigorous lines further on the speaker, supposed to be a Florentine of the period, refers to its origin and his hatred of the original founders :—

> "A feast was held that self-same night
> In the pile that the mighty shadow makes.
> For Via Larga is three-parts light,
> But the palace overshadows one,
> Because of a crime which may God requite!
> To Florence and God the wrong was done,
> Through the first republic's murder there
> By Cosimo and his cursed son."

The palace is a remarkable example of the application of the classic cornice to a whole building, and not to a mere order attached to it; and its architectural effect really depends mainly on this tremendous cornice which (like that of its twin-palace the Strozzi) projects nearly 10 ft. from the wall line. The treatment, other than that of the cornice, is rather flat and tame, and in this respect it looks less effective in perspective than in the engraved elevations published in architectural books.

The drawing was made for us by Mr. A. C. Conrade.

PORTION OF FACADE, SIENA CATHEDRAL.

THIS façade was designed by Nicolo Pisano; it shows, in its centre gable, a very effective combination of three primary forms —the square, niche, and triangle. The lower stage contains three great doorways, with massed arches, pediments, and elaborate sculptural decoration. Detail, suggestive of the Early Renaissance, is largely introduced, though the feeling throughout remains Gothic. Each one of its crowded shafts has a different treatment, whether of spiral, narrow panelling, or fluting; the same applies to the recessed arch-moulds. The capitals are evidently based on the Corinthian; above the caps are, on projecting brackets, some very spirited figures of horses and lions. The building was, on account of the plague of 1356, never completed, and consists at present only of the transept of what was intended to have been a vast cathedral. The foundations of the nave, etc., were laid, and can still be traced.

The Fatherless and Widow. The Winged Messenger of Peace.

"Peace": Group on the New War Office.

At each angle of the platform before the front is a column (not seen in sketch) surmounted by a group of the female wolf with Romulus and Remus; in reference to the derivation of Siena from a Roman colony.

A. C. C.

THE PICCOLOMINI ALTAR, SIENA CATHEDRAL.

THIS is a pleasing example of somewhat Early Renaissance. There is an iconostasis in three stages, each of which contains niches with figures of saints and ecclesiastics, with the figure of the Virgin in the centre of the upper stage, the right-hand niche of which latter is, for some reason, empty. The whole is effectively set off by the horizontal lines of the light and dark marbles which clothe all the walls and columns of the interior of Siena Cathedral. A semi-domed recess contains the altar.

A. C. C.

ILLUSTRATIONS OF THE CHURCH OF SS. SERGIUS AND BACCHUS.

OF the four sheets of illustrations of this celebrated church, given in this issue, the sheet of "Interior Views and Details" is from photographs taken by Mr. Arthur E. Henderson; the drawings are executed by him from measurements taken on the building, which he has been studying on the spot for many months. They are referred to in the article by Mr. Henderson, which, with other sketches and diagrams, will be found on another page.

VIEWS OF OLD LONDON IN THE NEIGHBOURHOOD OF THE SAVOY AND CHARING CROSS.

THESE two sheets of views are reproduced from old prints and drawings in the invaluable Crace Collection in the print-room of the British Museum. They are given as illustrations to the article on this portion of old London which appears in the present issue, and to which the reader is referred.

UNDER THE TEMPLE PORTICO.

THE intention of this drawing was to give the effect of a view of a landscape from beneath the portico of a Doric temple in strong shadow. It is not entirely realised in the reproduction; lithography by the agency of the photograph is a useful but somewhat capricious servant to the artist; you never know quite what it will do; and in the present case it was found that in an impression in which the foreground was as dark as in the drawing, the distance had chosen to come out much darker than in the drawing, and to avoid this defect it was necessary to print the whole in a lighter tone, which does not altogether realise the effect aimed at in the drawing.

The scene is, of course, wholly imaginary, but the arrangement of columns, with thicker columns and wider inter-columniations in the exterior order, is taken from the Parthenon portico. It is, in fact, a very unusual arrangement as far as existing remains give evidence, but it suited the composition better than placing the outer and inner columns on the same axis.

It being a festival day (for which the young lady in the foreground is an early arrival among the spectators), the temple was festooned externally with garlands, which show against the sky, and help to break the rigidity of the horizontal lines of the entablature.

It is worth while to remark, when people are constantly exaggerating the idea of the entasis in Greek columns, that the slight entasis shown in these columns, and which is barely noticeable to the eye (but which will appear on applying a straight-edge to them), though it was intended to represent the entasis of the Parthenon columns, is really considerably in excess of that; and that on the scale of the foreground columns in this drawing the entasis as existing in the Parthenon would be represented by a deviation from the straight line of little more than half the thickness of a post-card. I tested this by scale, applying the edge of a post-card to the scale, where it just filled up the inch (the Parthenon entasis is ·56 of an inch). The fact is a significant commentary on the exaggerated representations of entasis which are now often made in drawings of Greek architecture. H. H. S.

(*Continued from page* 15.)

landing-stairs at each abutment are a noteworthy element of the design. The dry or land arches of brick on the Surrey side are forty in number; thirty-nine of them are semi-circular, 16 ft. in diameter, and one is semi-elliptical over Narrow-wall and 26 ft. in diameter. The first stone was laid on October 11, 1811. The total length of the bridge and causeways amounts to 2,456 ft., made up of 1,380 ft. for the bridge and abutments, 310 ft. for the approach from the Strand, and 766 ft. for the causeway on the Surrey side. The piers are 87 ft. in length at the base. The bridge is 42 ft. wide between the parapets, with a roadway of 28 ft. The cost, with the approaches, amounted to 937,391*l.* 11s. 4d. Sir John Rennie, who assisted his father in the work, relates in his Autobiography that the piers and abutments were founded on the solid bed, a strong gravel, of the river, and that they rest upon a wooden platform, carried by piles 12 in. in diameter, driven 20 ft. into the bed. In his paper upon "Foundations," printed in the *Builder* of May 28, 1898, Mr. A. T. Walmisley mentions that this was the first bridge on the Thames for which cofferdams were employed, being composed of double piling, with puddle between the piles. As in the case of old Blackfriars and Westminster bridges, the foundations were not carried through the sand and gravel down to the clay, and there was one pile to every square yard of bearing surface at the piers. The heads of the piles, having been sawn off, timber bearing piles and pieces were fastened on, both lengthwise and transversely; on them was fixed a flooring of 6-in. planks, to take the first course of masonry. Under their Metropolis Toll Bridges Act, 1877, the Metropolitan Board of Works bought the bridge for 474,200*l.*, and, on October 5, 1878, opened it free from toll. Indications of the subsidence had already become manifest; in 1877 stones were dropped around the piers—a futile expedient which created a backing-up of the water, and scoured out a deeper channel under the arches. Throughout the year 1879 the mean low-water level of the river was 1 in. lower than in the forty-five previous years, and the high-water level was nearly 3 in. higher than in any year before 1875. In 1882 Mr. Edward Bazalgette, engineer to the bridges belonging to the Board, made an examination of the foundations. His investigations revealed certain facts which amply justified a warning given by this journal, albeit our presage was but lightly esteemed at the time. The demolition of old London and Westminster bridges, the building of the embankment, and other concomitant causes had deepened the stream under Waterloo Bridge to an additional extent of 8 ft. The piles, denuded of the gravel, had sunk beneath the superincumbent weight. Mr. Bazalgette drove great piles around portions of the piers; their spaces were caulked with oakum and puddled, and the water was then pumped out of the dams. Each pier was then seen to rest upon vast blocks of rough Bramley Fall and Craigleath stone, which had become crushed down by a load, for each pier, calculated at about ten to eleven thousand tons; the measure of the dropping of the bridge could be gauged from the circumstance that the cut-waters, not being a part of the actual fabric, had preserved their original level. The footings rested upon piles of beech, set in rows, 3 ft. 6 in. from centre to centre. Mr. Bazalgette concentrated his labours upon the arrest of a mischief which could not be entirely remedied. He lowered blocks of concrete, weighing from 5 tons to 6 tons, into position on the river bed, so as to form an apron from 4 ft. to 5 ft. 6 in. thick, and as hard as the solid rock, around each of the piers. The apron sloped outwards from the pier at an inclination of 1 in 5·6, and extended 18 ft. all around, its outer edge reaching to the piles of the dam, of which the lower portions were left as an outwork to protect the foundation piles if the river should become deeper still. The piles of the dam are massive beams of American rock elm, and, being cut off at the level of the concrete apron, prevent scouring of the gravel beneath it. W. Webster contracted for 70,000*l.*, and completed the work from shore to shore in 1884. The bridge, which Canova said was the most beautiful structure in London, was opened as Strand Bridge by the Prince Regent and the Duke of Wellington on June 17, 1817, and Constable depicted the scene. Rennie died on October 4, 1821. In June, 1898, the London County Council began the substitution, at a cost of 500*l.*, of attenuated and tasteless electrical light standards for the eighteen lamp standards which had been especially modelled to suit the character of the bridge, and were, besides, uncommon and admirable examples of cast-iron design [July 2, 1904, the old and new standards]. The old railings, after a similar pattern, remain in Lancaster-place.*

Victoria-embankment.—The embanking of the Thames is no new thing. Many maintain that from Richmond it flows mainly between artificial limits, and that the earthworks for protecting the marshes in the lower reaches are of Roman origin. It must, however, suffice to merely mention that many encroachments and short embankments were made in later times along both shores, in London, and that larger schemes have been propounded by Wren and Evelyn, and, in the XIXth century for the left bank, by Thomas Harrison (1810), Colonel Sir Frederick Trench (1828) for a viaduct level with Somerset House terrace, and carrying a railway, James Walker and others for the City Corporation (1841), and James Edmeston, whose project is described in the *Builder* of June 29 and July 6, 1861. A report (1844) of a Commission contains plans advanced by Sir Charles Barry, Trench, Thomas Page, Walker & Burges, and John Martin, the painter. Martin exerted his unfruitful labours over the interval 1827-50; he was the first who proposed to intercept sewage from the river; he published drawings of his conceptions, notably a set, in 1836, for a sewer-quay, colonnaded wharves, and a railway. Martin's plans for public walks with gardens upon the river's bank, and Wren's for a new quay, partly begun under the Acts 1666-7 and 1670, in Upper Thames-street and a "fair quay or wharf on all the river side from London Bridge to the Temple of the breadth of 40 ft., as also from the Tower wharf to London Bridge," are described in the *Mirror*, vol. xxviii., 1836. In August, 1860, a Select Committee of the House of Commons reported in favour of three schemes formulated by Sir Joseph W. Bazalgette, Bidder, and Forster, respectively, out of more than fifty submitted for an embankment from Westminster Bridge to Queenhithe. They recommended that the construction should be entrusted to the Metropolitan Board of Works, who, being charged under the Act, 21-2 Vict. c. 104, with the metropolitan main drainage, had powers to deal with the foreshore for that purpose, and that the coal and wine duties, to expire in 1861, should be temporarily renewed to supplement the funds already voted for the new low-level sewer. They estimated the total outlay at 1,000,000*l.*, including, at least, 250,000*l.* for the sewer, and that the ½d. wine duty and the 8d. and 1d. portions of the coal taxes would yield about 100,000*l.* per annum. The Commissioners appointed in the following year to consider the plans preferred one by F. W. Shields [August 3, 1861, two alternative sections; with text of report] for a solid embankment from Westminster to Blackfriars, with a sewer beneath the road, to many projected viaducts with docks. Whilst recommending that the embankment should not extend below Blackfriars Bridge in view of the anticipated heavy claims for compensation, they advocated the laying-out of a new street from the bridge, instead of from Queenhithe, across Cannon-street, to the Mansion House, and the making of a viaduct eastwards from the Temple Gardens, with waterways to the City of London Gas Company's works, and the adjacent wharves in Whitefriars. An Act of 1861 renewed the coal and wine levies until 1872. The much-vexed question of intercepting vehicular traffic along the east front of the Crown property at Whitehall was ultimately decided in the negative. The Thames Embankment (North) Act, 1862 (25-6 Vict. c. 93) did not include the new road—Queen Victoria-street—through the City, for which statutory powers were obtained in the following year, but did include certain works which were abandoned under an Act of 1868, as, for instance, a

* In August last, after consultation with Sir W. Richmond and Mr. G. Frampton, R.A.A., the Council agreed to replace the old standards and fit them with incandescent burners.

viaduct for a road, 70 ft. wide, from the Temple Gardens to Blackfriars Bridge, and a street from Lancaster-place, having a gradient rate of 1 in 40, and partly upon arches through the Savoy, and beneath Hungerford Bridge to Northumberland-wharf, communicating with Villiers and Buckingham streets and with a new street from Whitehall-place to George-street, near the Adelphi. The proposed viaduct of two arches, having a span of 70 ft., and a headway of not less than 8 ft. above Trinity House high-water mark in front of the gas-works, together with a similar arch in front of Whitefriars Dock, were disposed of by the more successful action of the Metropolitan District Railway Company. In a report of October 22, 1862, Sir Joseph Bazalgette, Chief Engineer to the Board, stated that the clear waterway of the Thames was 900 ft. at Blackfriars and Westminster, 1,120 ft. at Waterloo, 1,020 ft. at Hungerford, 660 ft. at Southwark, and 700 ft. at London bridges, so that at the two last-named places the tidal water flowed with a velocity enough to keep the channel free from deposit. But where it spreads to nearly double the width, as at Waterloo Bridge, a partial and contracted channel is formed in the north bend, with much deposit on the south side. He first struck his embankment line to take in the second arch and pier of that bridge, which would have given a more uniform section of river and 8 acres more of reclaimed land. Through some bungling, for which the Board were not responsible, the limits of deviation did not take in the second pier of the bridge. The entire scheme, as amplified by the Act of 1863, included the right bank of the Thames from Vauxhall to Westminster Bridge, and was connected with the sewerage and street improvements in the City and the western parts of the town.

Of the three separate contracts, comprising numerous short lengths of intercepting sewers, but excluding 30,000*l.* for ornamental work, standards, etc., the length, 3,740 ft., from Westminster Bridge to a short distance below Waterloo Bridge, was undertaken by George Furness (*ob.* 1890) for 520,000*l.*; the length, 1,970 ft., to the east end of Temple Gardens by Ritson & Co. for 229,000*l.*, the resident engineers being Mr. T. Lovick and Mr. E. Cooper, respectively; W. Webster took the third contract to Blackfriars Bridge, and made the roadway throughout. The contractors carried the foundations to a considerable depth, for the removal of old London Bridge had caused a deepening of the river bed, which contributed to the failure of old Westminster and Blackfriars Bridges, and was also affecting Waterloo Bridge. Dispensing with the old coffer-dam method Bazalgette chose, he says, a system of excavation within a connected line of iron caissons sunk below the bed and filled with Portland cement concrete to within 6 ft. from low-water level, and otherwise constructed so as to form a full-tide dam (Fig. 4). The specifications required that the river-wall foundations should be taken down to 20 ft. at least below Ordnance datum—that is to say, to 32 ft. 6 in. below high-water level, or 14 ft. below low-water level; the river wall to be faced with granite to a curved batter from 2 ft. below low-water mark to about 1 ft. 6 in. below high-water mark, where should be a chamfered plinth and surbace mouldings to a plain face of about 2 ft. forming a sub-plinth to the parapet; a counter-fort, 3 ft. thick, to be built over the arch of the subway at the back of each of the fifty-eight lamp-pedestals to receive the washers of a long mooring bar passed through the entire construction, and attached to the mooring rings upon the pedestals. Each ring, of cast and hammered gun-metal, appears as though it were held in a lion's mouth. For Furness's contract the caissons, contrived by Mr. Joseph Phillips, of Messrs. Cochrane, were oval on plan, 12 ft. 6 in. by 7 ft., outside measurement, having end-grooves 6 in. wide and deep. In each caisson the groove, with a similar one in the butted end of the next caisson, took the timber pile which formed one of the guides to the descent of the caissons as well as a joint, made water-tight with packing. Each caisson was built in divisions 4 ft. 6 in. high, the divisions being of wrought and riveted boiler-plate where left in below the bed, and of cast-iron where above and serving merely for the dam. Before the building up and sinking of the caissons the line of the face of the embankment was obtained with sufficient accuracy: at about the middle of the length from one bridge to another a point was fixed in the rear of the general line of staging, and marked with a pole or wand resting upon a small staging; the lines from each point to two points on the bridges made a large angle, in which the curve was found by offsets taken at every successive 50 ft., namely, at the end of four caissons.* The steamboat piers, landing-stages, and stairs for smaller craft, constituted an important feature of the work. The old piers, whereof some yet remain at other points on the river, consisted of worn-out barges, with shifting gangways; they had been replaced here and there with the improved structures of the Conservancy Board, the Cadogan suspension pier at Chelsea, and Thomas Cubitt's pier at Pimlico. The embankment dumbies, or pontoons, rise and fall on the tide in recesses, of which those at Charing Cross and Waterloo bridges [July 30, 1864] contains the storm-water outfalls of the Northumberland-street and Savoy-street sewers. Temple pier and landing-stages, over 470 ft. long, comprise a recess of 250 ft. for the pontoon, with a middle recess 25 ft. wide at the back, the total projection into the river being 31 ft.; the recesses contain the outfalls of the Essex-street and Norfolk-street sewers. At Waterloo Bridge the total length is about 80 ft. more, for two recesses, the foundations of which, as well as of the wall, were carried down lower than the foundations of the pier of the bridge, and the soil about the bridge-pier was enclosed within a permanent dam of cast-iron plates and piles secured to the older footings with iron tie-rods bedded in concrete whereon was laid an inclined apron of granite blocks everywhere dowelled together. A large rusticated arch, with console head and plinth and pedestal for sculpture, breaks the parapet at Temple pier. It was originally intended to remove York watergate to opposite Whitehall-gardens, and to put it in the middle of a projecting space 108 ft. long, having two end pedestals for sculptured lions couchant, recesses for seats, and landing-stairs in three flights. The main roadway is 100 ft. throughout, with a carriageway of 64 ft. The general level of the road is 4 ft. above high-water mark, with an upward incline at each end. Within the wall and embodied in its structure is the northern low-level intercepting sewer, fully described in the *Builder* of August 27, 1864, an integral component of the Main Drainage scheme, having a diameter of from 7 ft. 9 in. to 8 ft. 9 in.; above the sewer is a subway, 7 ft. 6 in. high by 9 ft. wide, for pipes, wires, etc., both being beneath the footpath nearer to the river. The embankment is 1 mile 453 yds. long; of the total area, 37½ acres, reclaimed, 19 acres are absorbed by roads and paths, and 7½ acres passed under the Act to the Crown, the Inner and Middle Temple Societies, and other riparian landowners. About 9 acres were devoted in perpetuity to the public benefit and enjoyment mainly through the exertions of W. H. Smith, M.P. for Westminster, who, on August 7, 1870, carried a motion by 156 to 106 votes against the Government for an address to Her Majesty praying she would be pleased to direct that no public offices be erected on that portion of the embankment which is reserved to the Crown, and which had been reclaimed from the river at the cost of the metropolitan ratepayers. The gardens of the houses at Whitehall were lengthened; the Templars were inhibited from building on the land added to their gardens; but that provision was relaxed by the Board of Works' Act of 1875 which permitted an encroachment in favour of Temple Gardens-chambers (see the Temple). A subway at Westminster affords access to the Houses of Parliament, the bridge, and the railway station. The net cost, with that for ancillary works, amounted to 1,156,981*l.*; with Bazalgette (*ob.* 1901) were associated C. H. Driver (*ob.* 1900) for the architectural features of the wall and stairs, and John Dixon, C.E. (*ob.* 1891), for the landing-stages and piers. G. J. Vulliamy, the Board's Superintending Architect (*ob.* 1886), adjusted the settlement of compensations—about 450,000*l.* in all, and the purchases of property; Mr. A. McKenzie and Mr. Weston laid out the three ornmanetal grounds. The work was begun in the autumn of 1863, the first pile being driven in front of Montagu House, Whitehall; on July 20, 1864, Sir John Thwaites, chairman of the Board, laid the first stone in a dam sunk to 21 ft. below high-water mark on to the concrete bed and footings of the wall and sewer construction near Whitehall-stairs; on July 13, 1870, the King (then Prince of Wales) and the Princess Louise opened the Embankment on behalf of the Queen. The section, reproduced from the *Builder* of August 6, 1864, shows the actual construction of the permanent coffer-

* The curve from Westminster Bridge to Temple Pier is not quite circular. The writer finds it nearly coincides with an arc struck at a radius of say 3050 ft. from a centre in Waterloo-road between Aubin-street and Holmes-terrace, and passing through those two points.

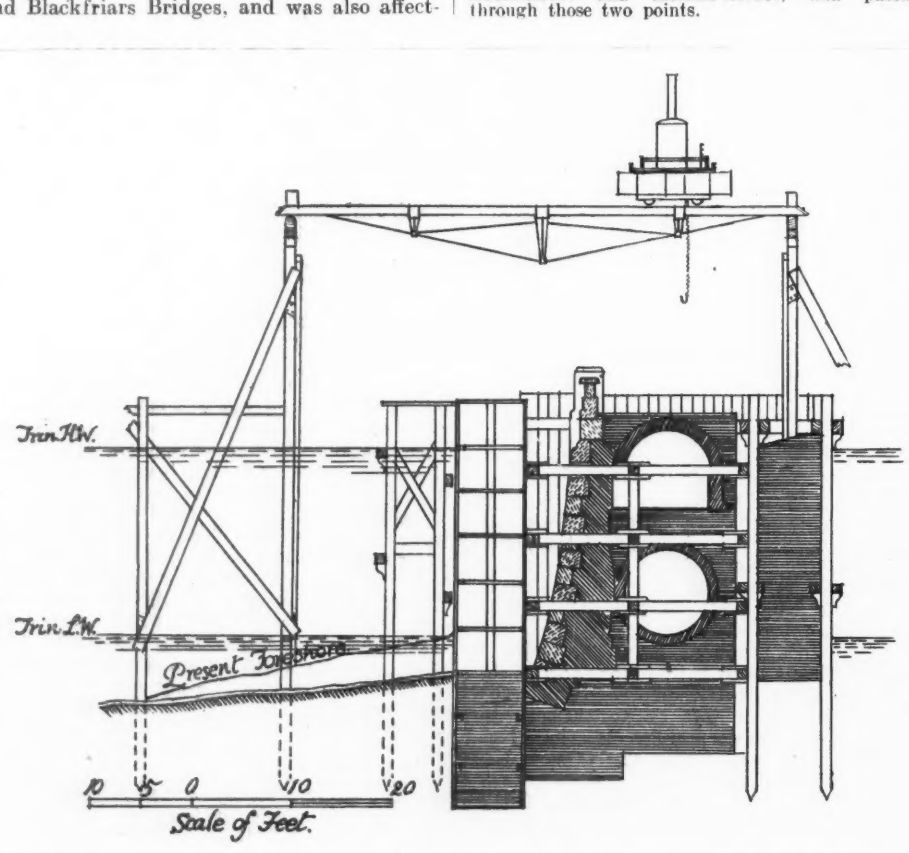


Fig. 4. Section of Coffer-dam used in Laying Foundation-stone, Retaining Wall, Sewer, and Subway of Thames Embankment, and Caissons forming the Front of the General Coffer-dam Construction in the first Contract. (*From the "Builder" of August 6, 1864.*)

dam, with the caissons forming the front of the general dam or coffer-dam construction, and the retaining wall, sewer, and subway, foundations, etc., between Westminster and Somerset House. An Act of 1872 placed the whole thoroughfare, which passes through several parishes, under the control and management of the Board. The road is not much frequented, but is found convenient for the assemblage of troops, and the marshalling of processions; the side streets from the Strand and Fleet-street are narrow and steep; with a few exceptions the buildings that line its course are unworthy of their position. Nevertheless, he has not seen London who has not seen it from Victoria-embankment in the early morning, or evening, of a bright summer's day.

SOME NOTABILIA.

Views, Plans, etc.—The riverside palaces, by Hollar, prints by Herbert and Wilkinson, 1808, that of York House from the drawing, 1630, in the Pepysian Library at Magdalene College, Cambridge: plan of Essex and Arundel Houses [March 18, 1899]. Ogilby & Morgan's map, etched by Hollar. View in five sheets of the Thames side between Westminster and London bridges—S. & N. Buck, 1749. Trench's design for a high-level embankment. Hungerford Market, old and new, *Gent. Mag.*, August-September, 1832, and the *Mirror*, July 6, 1833. Beaufort-buildings—P. Sandby's wat. col., Crace Collection. The Savoy: Hollar's scarce etching of river front, 1650; Wren's plan, "Fauntleroy" Pennant, Soane Museum; Vertue's views and plan, 1736—*Vetusta Monumenta*, ii., 1750-4; remains of the Savoy, 1847—Archer Collection, ix. Dorset-gardens Theatre: J. Nicholls & Co.'s print, with historical account—*Gent. Mag.*, 1813-14; S. Nicholls's large view of London, *c.* 1710; Wilkinson's *Londina Illustrata*, and others. Bridewell, the *Mirror*, November 12, 1831. *Embanking of the Thames.*—Historical articles in *Builder* of 1855, June 29. July 6 and 13, 1861, and October 15, 1864. In his article of July 13, 1861, C. H. Smith states that the width of the river at high water was at Nine Elms, 680; Vauxhill Bridge, 702; Millbank Penitentiary, 600; Millbank, 1,050; Westminster Bridge, 1,200; Adelphi, 1,480; Somerset House, 1,250; Temple, 1,240; Blackfriars Bridge, 995; Queenhithe, 700; Southwark Bridge, 720; and London Bridge, 946 ft. *Stairs, Wharves, and Docks.*—Manchester, Whitehall, Hungerford (½d. steamboats to London Bridge), Black Lion, York-buildings, Salisbury, Worcester, Savoy, Waterloo, Somerset, Strand-lane, Surrey, Arundel, Essex (or Milford), Temple, Waterman's, Whitefriars, Dorset, and Fleet stairs; Scotland-yard, Northumberland, Adelphi, Salisbury, Savoy, and Grand Junction wharves; Scotland, Whitefriars, and Bridewell docks.

Savoy.—Chapel Royal: memorial windows to Rev. H. White, chaplain, 1891—Clayton & Bell; Albert, Prince Consort—Willement; D'Oyly Carte [March 14, 1903]—Mr. E. J. Prest and Mr. J. E. C. Carr. Lancaster-place and Duchy of Lancaster Office—Sir R. Smirke (*ob.* 1867): site of houses of A. Cruden, Jacob Tonson, and the King's printers.

The Temple (riverside).—Embankment of the gardens—R. Mylne (*ob.* 1811); Middle Temple Library [December 15, 1860]—H. R. Abraham; Plowden-buildings, Nos. 1, 2—Jas. Savage (*ob.* 1852); Temple Gardens-chambers at south end of Middle Temple-lane [June 14 and December 6, 1879]—E. M. Barry for Inner Temple and J. P. St. Aubyn (*ob.* 1895) for Middle Temple, all the exterior by Barry; "Justice" and "Learning" at central archway—W. C. Marshall, R.A.; G. W. Booth, contractor, 1878-80. Gate, King's Bench-walk and Tudor-street, 1887—A. Cates (*ob.* 1901). Sundial, 1731, with leaden figure of negro, removed to gardens from Clement's Inn, 1886. King's Bench-walk (south end), 1814—Sir R. Smirke. Paper-buildings (south end), 1848—S. Smirke

Victoria-embankment.—Materials used: granite, 650,000 c. ft.; brickwork, 80,000 c. yds.; concrete, 140,000 c. yds.; earth filling, 1,000,000 c. yds.; excavation, 144,000 c. yds.; York paving, 125,000 ft. super.; broken granite, 50,000 yds. super. Low-level sewer, as part of the main drainage scheme—Bazalgette's paper in *Proceedings* of the Institution of Civil Engineers, vol. xxiv., 1864-5; and detailed account of the construction—*Builder*, August 27, 1864. The Syene granite obelisk of Thothmes III. removed by Cleopatra from Heliopolis to Alexandria and erected 22 B.C. before the Cæsareum or temple of Cæsar Augustus; Mr. Waynman Dixon wrote to the *Athenæum* of July 7, 1877, that he had found Greek and Latin inscriptions stamped on a claw of one of the original bronze base-crabs: "Anno viii Avgvsti Caesaris Barbarvs Praef Aegypti posvit Architectante Pontio"; given to England by Mahomed Ali; towed, after an adventurous voyage, to the Thames by John Dixon, C.E., at the charges, 10,000*l.*, of Professor Sir James Erasmus Wilson, 1877-8; the pedestal and two sphinxes—G. J. Vulliamy and C. H. Mabey. The lions' heads with mooring rings and the two lamp-standards with figures of boys—T. Butler; lamp-standards with claw-base [March 19, 1870]—Bazalgette; with intertwined dolphins, on parapet of wall—Vulliamy. Electrical light installation in 1878-9—Bazalgette; and since—Sir A. Binnie; generating station—Mr. W. E. Riley. Bazalgette memorial—Mr. G. Simonds; Sir Walter Besant memorial. Boadicea group—T. Thornycroft, whose son, Mr. J. I. Thornycroft, presented the bronze casting (J. Singer & Sons) to the London County Council; the pedestal—Mr. T. G. Jackson, R.A. *The Gardens.*—Statues of W. Tyndal—Sir E. J. Boehm (*ob.* 1890); Sir Bartle Frere—C. B. Birch, 1888; Sir James Outram—M. Noble, R.A.; Burns—Sir John Steell, R.S.A., 1882; R. Raikes—Mr. T. Brock, 1880; I. K. Brunel; W. E. Forster, M.P.—Mr. Hope-Pinker, 1890; J. S. Mill—T. Woolner, R.A. Memorials to Sir Arthur Sullivan (*ob.* 1900)—Mr. W. G. John, A.R.A., and Professor Fawcett, M.P. [November 27, 1886]—Mr. B. Champneys, bust by Miss Grant, decorative portion by Mr. G. Frampton, R.A. The two wrestlers (1894) dug up at Portici in 1754, conf. Maréchal's & F. A. David's "Les Antiquités d'Herculaneum," 4°, 1780, vol. vii. Surrey-street, south end, east and west blocks—Mr. D. C. Nicholls.

St. Stephen's Club [April 11, 1874]—John Whichcord the younger. Ordnance and Transport Office, Board of Controul, and, lastly, Civil Service Commission—W. Pilkington, 1816; site of "A" police-station, etc.—Mr. J. Dixon Butler, 1900. New Scotland-yard—Mr. R. Norman Shaw, R.A., 1888-90, on site of the abortive Grand National Opera House, of which Mme. Tietjens laid the first brick on September 7, 1875. Royal Avenue Theatre—F. Fowler, 1881-2. Examination Hall, Royal Colleges of Physicians and Surgeons [March 20, 1886]—Mr. Stephen Salter. Offices for the (late) London School Board [December 30, 1882; March 13, 1886]—Messrs. Bodley & Garner, 1874; west extension—Mr. E. R. Robson, 1885; further enlargement, 1891-2—Mr. R. W. Edis; sculpture over later doorway—Mr. Dressler; Astor Estate Offices, 1893—J. L. Pearson, R.A. (*ob.* 1897); sculpture by Mr. Nicholls. Temple-chambers—J. Whichcord, 1885: National Telephone Company [May 26, 1900; January 25, 1902]—Mr. A. N. Bromley, 1898-9, carving by Mr. G. Seale, Messrs. Foster and Dicksee, contractors: Metropolitan Asylum Board [June 11, 1898]—Mr. E. T. Hall, 1897-1900, carving by Mr. Felix. Messrs. Shillitoe & Sons (super-structure) and Leslie & Co. (foundations): Temple House—F. R. Boreham (*ob.* 1901): Hamilton House [July 22, 1899]—Sir W. Emerson: National Press Agency [January 16, 1897]—Mr. E. T. Hall, and Fire Brigade station, Carmelite-street, 1897—T. Blashill (*ob.* 1905): Thames Conservancy—Messrs. Hunt & Steward, 1893-4. Guildhall School of Music [September 5, 1885]—Sir Horace Jones (*ob.* 1887), extension in John Carpenter-street—Mr. Andrew Murray, 1897-8. City of London School [May 5, 1880, view and four plans; December 16, 1882, great hall]—Messrs. Davis & Emanuel; general architectural carving by Mr. G. W. Seale; Messrs. John Mowlem & Co. (main structure) and Messrs. Higgs and Hill (foundations): removed from Milk-street, Cheapside. Wm. Ward's City of London School for Girls—Mr. A. Murray, 1892-3; Messrs. Atherton & Latta, contractors. Sion College [May 1, 1880, view; May 5, 1888, detail elevation and ground plan]—Sir A. W. Blomfield (*ob.* 1899); Messrs. Foster & Dicksee.

The Thames.—Cleopatra swimming bath removed from Charing Cross Bridge, 1894. The Thames Police exchanged their ship *Investigation*, removed for the embankment, for a floating pier at Waterloo Bridge. The R.N. Artillery Volunteers' *Rainbow* succeeded, May, 1888, by the gun-boat *Frolic*, moored near Somerset House, which, on the disbandment of the corps in 1892, was taken to the river Crouch for coastguard service; since replaced by the R.N.V. Reserve ship *Buzzard*.

NOTES ON NEW BUILDINGS IN LONDON.

V.—CAXTON HOUSE, WESTMINSTER.

ON the north side of Tothill-street there has just been completed (externally at least) one of the immense blocks of new stone-fronted buildings which are now rising in so many parts of London. The prevalence of stone we are glad to see; after all that may be said about the colour effect of red brick (which does not retain its richness very long in London), there is no building material so noble and monumental in its effect as good stone; and though it darkens, it does not become grim with age, as brickwork does. Caxton House has the now usual sin of being too high for the width of the thoroughfare, and we suppose this running to height is inevitable; it might indeed be urged that the sin lies with our forefathers, who did not lay out wider streets.

Unlike the remarkable building last under our notice, Caxton House, which appears to be intended as a block of offices in the lower portion and perhaps of residential chambers above—that at least is the impression produced by the exterior treatment—is entirely built with the orthodox construction of piers over piers and openings over openings. The lower two stories are treated architecturally as one, and form a lofty rusticated podium to the remainder of the elevation. This is boldly treated with a series of arches running through both the lower stories, which are marked off only by the window and floor lines crossing the openings. This is a bold and effective treatment, but it cannot be denied that the proportions both of arches and piers are too high and narrow for the best effect, and the piers appear wanting in solidity and mass, not constructively but architecturally, for the mass of the building carried by them. Very likely the architect is of the same opinion, and has done his best to conciliate architectural effect with demands for light; but we are almost inclined to think that a better effect would have been produced by making the arcade a lower and wider one for the ground story only, as in the building in the Strand described last week, and grouping the windows of the next story with the others above the rusticated base. To the high rusticated base in itself we see no objection, only to the narrow proportions of the piers and arches in it. The three stories above are divided into bays by large pilasters treated with a simple panelling which has a good and refined effect; the windows between are square-headed with a square panelled centre column below and circular columns in the next two stories. The effect of all this is quiet and refined, but the plain raised square panels with their angles cut out, which fill the spaces above the third floor windows, form rather a commonplace detail which is neither interesting nor ornamental. The centre of the front is slightly projected and emphasised by angle quoins corresponding with those at the angles of the building. The principal entrance is treated in the now rather hackneyed form of a rusticated arch with a concave quarter-circle curve on plan at the reveals, and a pedimented and columned doorway inserted beneath it. The projecting oriel, which runs up the centre above the doorway, certainly requires more appearance of architectural support than is given by the scroll cartouche which finishes under its flat soffit; it has the appearance of standing on nothing. The balcony above the main cornice, with the graceful sculptured figure carrying it from beneath, is much better managed; and the decorative iron railing is of a massive character suitable to the whole scale and size of the building. The central portion above the main cornice is a nice bit of composition, with its vertical curve in the shape of a segmental *fronton*, and the backward horizontal curve of the attic which finishes this portion; only we do not like the side scrolls or consoles; they are rather meagre in proportion for their surroundings, and not graceful in curve and outline.

A fairly powerful cornice is carried right round the building, breaking at the centre projection; it strikes us that it would have been better in effect had the modillions been closer spaced; they are rather wide apart.

The east or return elevation is very simply treated as a mass of brickwork, with cornice and angle quoins of stone. A deep recess in the plan on this side divides it into two pavilions treated alike, each with a stone oriel running up the centre in the middle of a field of brickwork. The effect of the massing of the building here, with the deep recess between the two wings, is very good from a distance, but will unfortunately be hidden when the new Wesleyan Hall is built, which will come to eastward of it with only a 40-ft. passage between.

ELECTRIC POWER BILLS IN 1906.

A LARGE number of private Bills relating to schemes for the supply of electric power to large consumers are down for consideration during the coming Parliamentary session. The large number of these Bills shows that the supply of electric power in bulk gives good promise of being commercially successful. The reason of this can be readily understood from an inspection of any of the more modern power supply stations which have been erected round London during the last two or three years. Take, for instance, the Brimsdown Station of the North Metropolitan Electric Power Company which supplies the power to work the Metropolitan Tramways. It is situated on the banks of a canal, so that the great quantities of coal slack required can be conveyed cheaply by barges, and the large amount of water required for condensing purposes can be had for a nominal fee, as it is returned into the canal. The crane and coal-conveyor plant for unlading the barges are worked electrically, and take very little power. As automatic stokers are used, and the ash and clinker are carried away by the buckets of the conveyor, practically no manual labour and almost no supervision is required in the furnace and boiler-house. The prime movers are Parsons' steam turbines, which require very little supervision, compared with that required by reciprocating engines. The dynamos are coupled directly to the turbines and generate at 10,000 volts. The power is transmitted at this pressure by a three-core cable, sheathed in lead, directly to the rotary converters at the tramway sub-station, twenty miles away. Under these circumstances it is not surprising that electric power can be sold profitably at a price less than half the minimum price required by an ordinary lighting station. One point

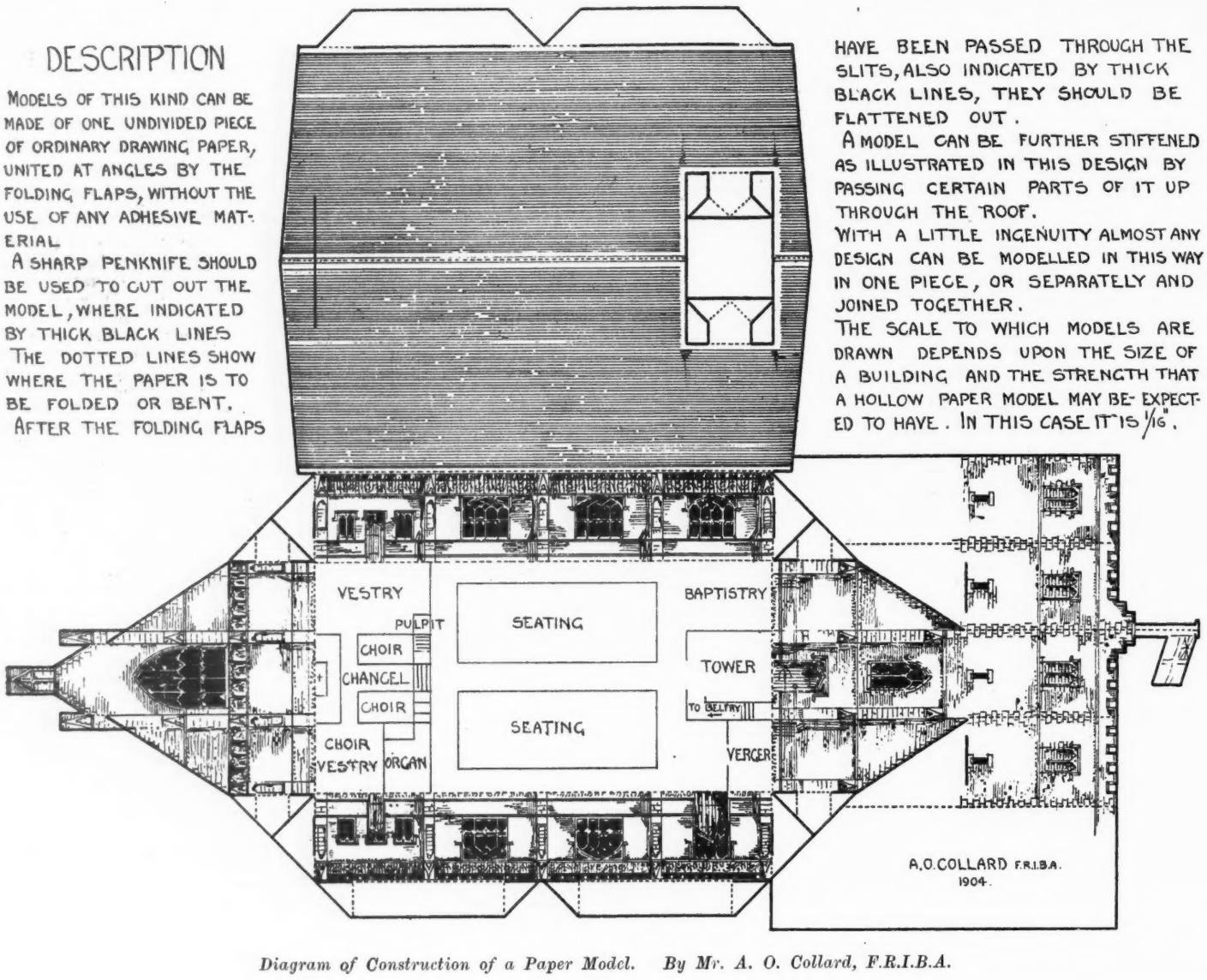

DESCRIPTION
MODELS OF THIS KIND CAN BE MADE OF ONE UNDIVIDED PIECE OF ORDINARY DRAWING PAPER, UNITED AT ANGLES BY THE FOLDING FLAPS, WITHOUT THE USE OF ANY ADHESIVE MATERIAL
A SHARP PENKNIFE SHOULD BE USED TO CUT OUT THE MODEL, WHERE INDICATED BY THICK BLACK LINES
THE DOTTED LINES SHOW WHERE THE PAPER IS TO BE FOLDED OR BENT.
AFTER THE FOLDING FLAPS HAVE BEEN PASSED THROUGH THE SLITS, ALSO INDICATED BY THICK BLACK LINES, THEY SHOULD BE FLATTENED OUT.
A MODEL CAN BE FURTHER STIFFENED AS ILLUSTRATED IN THIS DESIGN BY PASSING CERTAIN PARTS OF IT UP THROUGH THE ROOF.
WITH A LITTLE INGENUITY ALMOST ANY DESIGN CAN BE MODELLED IN THIS WAY IN ONE PIECE, OR SEPARATELY AND JOINED TOGETHER.
THE SCALE TO WHICH MODELS ARE DRAWN DEPENDS UPON THE SIZE OF A BUILDING AND THE STRENGTH THAT A HOLLOW PAPER MODEL MAY BE EXPECTED TO HAVE. IN THIS CASE IT IS 1/16".
VESTRY
PULPIT
CHOIR
CHANCEL
CHOIR
CHOIR VESTRY
ORGAN
SEATING
SEATING
BAPTISTRY
TOWER
TO BELFRY
VERGER
A.O.COLLARD F.R.I.B.A.
1904.

Diagram of Construction of a Paper Model. By Mr. A. O. Collard, F.R.I.B.A.

we wish to emphasise in connexion with the Brimsdown Power Station is that power is transmitted for twenty miles by underground mains at a pressure of 10,000 volts. The engineer tells us that there has not been the slightest trouble in working at this pressure since the station opened, about a year ago. It seems to us that the Parliamentary Committees should not sanction the claims made by many of the power companies—the London County Council amongst others—for permission to erect overhead mains without the closest scrutiny and a clear statement of the additional cost required for underground mains. The use of electric power for industrial purposes in London will probably increase enormously in a few years, but there is plenty of room for extension in most of the existing power stations. Owing to the great progress that has been made in electrical engineering, the mechanical and electrical problems involved admit of easy solution, and there is no reason for treating the promoters of the power Bills more leniently than the local authorities whose streets they are seeking permission to break up.

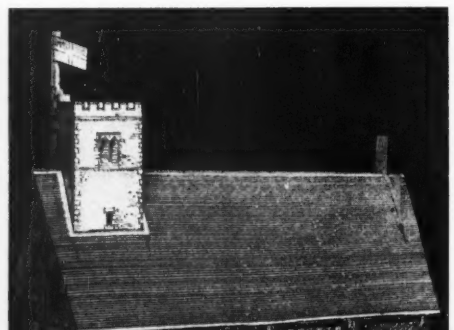
PAPER MODELS OF BUILDINGS.

WE give an illustration, from a drawing by Mr. Allan O. Collard, architect, of Buckingham-street, showing his method of making up a model of an architectural design out of elevations drawn on paper, and then put together. Mr. Collard writes:—

"The idea shown by the plan illustration, reduced from an eighth to the inch scale, was partly the result of a desire to show to a client, quickly and cheaply in model form, the general appearance of a proposed building. When drawn in some such way as suggested, and coloured, it can be cut out with a penknife and be united at the corners in a few minutes, the angle flaps rendering any adhesive fixing quite unnecessary.

A complete model is astonishingly substantial considering it is only made of ordinary drawing paper.

A large building of complicated plan could be treated with similar ease, by making some



of the blocks separately, though, of course, there may be limitations to the process. The small illustration is from a model actually made, to show how the idea works out."

SCHOOL, GLASGOW.—The Hayfield Public School, Glasgow, has just been opened. The school, situate at the junction of Rutherglen-road and South York-street, is a red stone three-story building, Italian Renaissance in character, and covering about 1,863 sq. yds. There are in all twenty-four classrooms, twenty-one of which have a southern aspect. The classrooms seat nearly 1,500 pupils. Accommodation for drill and marching is afforded by the central hall, which is 64 ft. long by 28 ft. broad. The walls of the rooms are timber-lined for 5 ft. up, those of the hall, passages, etc., being tiled to the same length. The architect is Mr. John Hamilton, I.A.

DIARIES AND ALMANACS.

VERY little can be added—except to mention certain new features—to what we have said in previous years concerning the "*Mechanical World* Pocket Diary and Year Book" for 1906 (Emmott & Co., Ltd., *Mechanical World* Offices, Manchester). A short section on the Steam Turbine, by Mr. R. M. Neilson, contains a concise account of and practical data as to seven varieties of this essentially modern type of prime mover. Another new section on Refrigerating Machinery, Ice Manufacture, and Cold Storage seems scarcely necessary in a handbook of this class, owing to the somewhat special character of the subject. Other additional information that is perfectly appropriate relates to High-speed Steel Tools, Screw Threads, the Strength of Crane Chains, Shaft Bearings, Gas and Oil Engines, and sundry matters of everyday interest to mechanical engineers and contractors. The table giving Factors of Evaporation, for use by engineers and boiler owners, has been extended by the inclusion of pressures from 150 lb. up to 300 lb. per square inch, and by doubling the number of temperatures for which factors are given. This is a desirable and perfectly appropriate addition to a convenient book of reference.

Messrs. Waterlow Bros. & Layton, Ltd. (Birchin-lane, E.C.), have sent us a copy for 1906 of the Architects' and Surveyors' Diary which they publish, and the excellence of which we have often referred to. The diary portion gives one day to a page, and there is an index in connexion with it. The rest of the work consists of all that useful information generally to be found in a publication of this kind, such as lists of members of the various professional bodies, the London Building Act, 1894, and the Amending Acts of 1898 and 1905, and much other matter of interest to professional men. The diary is published at 3s. 6d. and 6s., according to the binding.

From Messrs. Hudson and Kearns (Stamford-street, S.E.) we have received specimens of their excellent blotting-pads for 1906. The principal pads are No. 8A and the "Banker's," each of which consists of blotting-pad, blotting-pad diary, and date remembrancer, while No. 8A has provision for standing memos. These and other specimens are neat in appearance and very convenient in form and arrangement, and leave little or nothing to be desired.

The "City Diary" for 1906 (W. H. & L. Collingridge, 148 and 149, Aldersgate-street, E.C.) is the forty-third annual edition of a useful little diary containing much information as to City matters. The diary proper gives three days to a page, and is interleaved with blotting-paper. It is well bound and neat, and is published at 1s.

The "Gloucester Diary" (published for the Gloucester Railway Carriage & Wagon Company, Ltd., Gloucester) is well bound and convenient in size, but unfortunately the back of each diary page shows an advertisement.

Messrs. L. & C. Hardtmuth have sent us one of their "Koh-i-Noor Pencil Calendars."

Messrs. Edward Wood & Co., Ltd., constructional engineers, Cannon-street, E.C., have issued a neat little pocket diary for 1906. It contains tables of Safe Loads for Compound Girders and Stanchions, which have been considerably augmented.

Messrs. Ashwell & Nesbit, Ltd., engineers, of London, Leicester, Manchester, and Nottingham, have again issued their Shakspearean tear-off date indicator. The indicator is suitable for office use, as the figures are of good size.

Books.

The Architects' Law Reports and Review (illustrated). By ARTHUR CROW, F.R.I.B.A.; Legal Editor, A. F. Jenkin, of the Inner Temple, Barrister-at-Law. Vol. II. (London: Printer for Arthur Crow, 18, Great Prescot-street, E.C. 1905.)

THE second volume of "The Architects' Law Reports and Review," Vol. I. of which publication created a new departure in this form of literature, contains much information of use to that public whose requirements it is intended to serve, and who are particularised on the cover as being "architects, surveyors, engineers, and others interested in the laws affecting buildings and streets." It is stated in the Introduction that it was originally suggested that this work should be regularly issued in quarterly parts, but this scheme seems to have been abandoned, and apparently the publication of future volumes will depend upon the importance of the decisions given in the courts dealing with the subject matter this publication is concerned with. In the volume before us the first ninety-three pages constitute the Review, whilst the Reports fill 249 pages. Of the Law Reports themselves it is sufficient to say that they are reprinted, by permission, from the *Law Times* and the *Justice of the Peace*, and, therefore, their excellence and accuracy is assured. Certain plans and photographs have been published with them, and these may lend an additional interest to the Reports in the eyes of the lay reader, but will be accepted with caution by any lawyer, unless they were formally proved and put in evidence at the trial, a fact which will always be stated in the report. The cases contained in the Reports are grouped under alphabetical headings, and there is an index both to the names of cases and to their subject matter. The volume also contains what are termed "Accumulating Subject Indexes"—should not this be "Indices"?—this, in reality, is a digest under similar headings of the cases reported in the two volumes which have been issued, and thus every facility for reference has been afforded. The Reports are preceded by "Legal Notes," which are chiefly confined to some comments on the law regulating single private drains and by-laws as to lodging-houses. These notes appear to us written with rather more boldness than discretion. For instance, the statement that the Court of Appeal had no jurisdiction to hear the appeal in the case of Thompson *v.* Eccles Corporation seems unnecessarily daring in a publication of this description, and the notes generally appear framed rather with the view of criticising the judgments than of assisting the reader, and especially the lay reader, to a comprehension of the law which is binding upon him.

The first portion of the Review is devoted to the London Building Act of 1905—the Act which is intended to secure greater security from fire in the metropolis. There is an excellent Introduction, and the text of the Act is published with notes containing cross references and references to decided cases which should be most useful. This part of the work especially commends itself to us. The Act in question is one of those numerous "Private" Acts of Parliament which deal with matters of primary domestic importance to the public, and which are extremely difficult for that public to obtain information upon or to refer to. If we may make a suggestion to the editors in a most friendly spirit, it is that, in future publications of this Review, they should extend this part of their work even to the exclusion of so many reports of cases. We think, in doing this, they will be rendering a valuable service to those classes they intend to assist. Full reports of cases are not of so much assistance to the public this publication is intended for, except in cases when construction or drainage systems, etc., are entered into in detail, and, as a rule, a headnote, or a note in popular language, stating the effect of the decisions, is equally serviceable to the layman. Full reports of cases, moreover, in the space available, cannot be carried out exhaustively, thus, in the volume before us, only two cases on Workmen's Compensation are given, whereas, in the period covered by this issue, there are numerous decisions equally important and equally *ad rem;* but a publication of Acts of Parliament with notes such as the above, brought out as quickly as possible after the measures are passed, supplies a felt need, especially in the case of "Private" Acts, and we congratulate the editors on having engaged in this enterprise. The Act is well indexed, and the volume also contains papers on "Building By-laws and Rural Architecture," and "Matched-Lined Buildings and Escape from Fire."

Knight's Annotated Model Bye-laws. Seventh Edition. Edited and Revised by WILLIAM A. CASSON, of the Middle Temple, Barrister-at-Law of the South-Eastern Circuit; late of the Legal Department of the Local Government Board. (London: Knight & Co., Local Government Publishers. 1905.)

THE first edition of this work was published twenty-two years ago, the present author being associated in that and the subsequent editions with Sir Richard Thorne-Thorne and Mr. P. Gordon Smith. Owing to the death of these gentlemen, the present author has been left to edit this last edition alone, although, as he explains in a somewhat curiously-worded paragraph at the end of the Preface, he has received assistance from other of his late colleagues still associated with the Local Government Board. Perhaps the most important feature of the present edition is the inclusion of the Local Government Board's model code of by-laws for urban districts of 1904 and the model rural code of 1903. With regard to the rural by-laws, the author with a touch of officialism accuses the public of entirely failing to appreciate the real issues involved in the application of by-laws, but he himself refrains from alluding to the real point at issue—the discretion vested in local authorities to adopt by-laws unsuitable to particular districts. This work is invaluable to those in any way connected with local government, and, as the tendency to legislate by by-law is increasing, the demand for such a work must be the greater. The present edition consists of 342 pages and an index, and seems well edited and brought up to date. One or two of the recent cases on invalid by-laws in connexion with common lodging-houses might possibly have been included with advantage.

The Painter's Pocket-book. A reference guide in everyday work. By PETER MATTHEWS. (London and Manchester: John Heywood. 1905. 3s.)

THIS is a conveniently shaped book for carrying about, containing practical information in relation to house-painters' work. It contains a list of permanent and non-permanent colours, a table of combinations of colours for producing various tints; advice as to dealing with a great number of practical difficulties in connexion with defects arising in old work or from the nature of the materials to be painted, etc.; hints on practical geometry and setting out work; examples of various forms of lettering, etc. It seems a thoroughly practical little book, and likely to be very useful to painters.

BOOKS RECEIVED.

PRE-RAPHAELITISM AND THE PRE-RAPHAELITE BROTHERHOOD. By W. Holman Hunt. (Macmillan & Co. 42s.)

PROCEEDINGS OF THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS. Vol. XXXI.; 1904-5. Edited by Thomas Cole, A.M.Inst.C.E. (E. & F. N. Spon.)

SUBJECT LIST OF BOOKS ON HEAT AND HEAT ENGINES. (Patent Office. 6d.)

SUBJECT LIST OF BOOKS ON AERIAL NAVIGATION AND METEOROLOGY. (Patent Office. 6d.)

Correspondence.

"STANDARDISING" BILLS OF QUANTITIES.

SIR,—With reference to the several letters appearing in recent numbers of your valuable paper relative to the proposed standardising of quantities, the Council of the Quantity Surveyors' Association beg to state that they have had the subject under discussion for some months past (*vide* your issue of April 22, 1905, page 435, entitled "A Plea for a Uniform System of Measurement in England," and also that of June 3, 1905, page 595, entitled "Practice of Our Profession and Suggested Reforms"), and propose in due course to call a meeting of the various interested bodies to consider the matter.

F. B. HOLLIS,
Hon. Secretary and Treasurer
Quantity Surveyors' Association.

DRILL HALLS AND GYMNASIA.

SIR,—At a public meeting recently held at Royston (pop. 3,500) it was decided to try and raise a sufficient sum of money to build a drill hall and gymnasium with a false floor, under which a swimming bath should be built for use in summer. At a committee meeting held later it was felt that it was desirable to try and get information from towns where similar buildings existed, and that the best means of getting to know what towns possessed buildings of this description would be through the columns of your paper, if you would be kind enough to insert this letter.

Names of such towns and any information regarding probable cost of erection and subsequent upkeep would be gratefully received by me.

C. F. WIGHTMAN.

Royston, Herts.

The Student's Column.

SOME MATHEMATICAL METHODS AND USEFUL DATA FOR ARCHITECTS.—I.

Introduction—Mathematical Signs.

A FEW words will suffice to make clear the general aim of the articles commenced in the present issue. The possibility of misunderstanding may be prevented if we state at the outset that the series is not intended to constitute a mathematical treatise, although some simple branches of mathematics will necessarily be discussed.

After collecting and defining mathematical signs, symbols, and terms in convenient form for reference, we purpose to deal briefly with some labour-saving methods of performing calculations such as fall within the province of architects and others engaged in work connected with the design, construction, and equipment of buildings. Simplicity will be the keynote throughout, for simple methods are generally best suited for practical men, who regard mathematics merely as a means of arriving at approximately accurate results, and have other absorbing interests that debar them

from attaining those lofty levels where mathematical science is looked upon as an end and almost becomes a religion to its devotees.

Having dealt sufficiently with methods of computation, we propose to give selections of formulæ, memoranda, tables and diagrams, such as appear to us most likely to be of service to students of building construction and allied subjects. Trusting we may do so without offending the susceptibilities of architects already in practice, we add the suggestion that at least some of the material in the new series may be of use to those who have emerged from the days of youth but not from the age of study.

Modern science has advanced so rapidly that several subjects now brought within the daily practice of architects cannot be thoroughly familiar to all. Among such we may mention particularly steel and concrete-steel construction, modern systems of warming and ventilation, steam generation and distribution on a large scale, various applications of electricity for light and power, and sundry branches of engineering in connexion with which some architects are still apt to rely upon contracting firms for information and data.

There are only two correct ways of dealing with problems arising out of unfamiliar departments of work. One is to invite the co-operation of a consulting engineer, and the other for the architect to become his own engineer. The middle course of accepting guidance from prospective contractors is wrong in principle and is scarcely consistent with the dignity of a great profession.

One of our objects in presenting this series of articles is to help the rising and present generation of architects to become more dependent upon their own knowledge in dealing with subjects occupying a subsidiary place in ordinary curriculum of study, or lying beyond its limits.

MATHEMATICAL SIGNS.

\+ The *plus* sign, with five meanings:—

(1) Indicating *addition.*

Example: 2 + 3, that is, 2 added to 3.

(2) Indicating that figures have been omitted from the end of a decimal fraction, or that the fraction is only approximately correct.

Example: The square root of 2 is 1·414 +

(3) Indicating that the value of a number is more than zero, or the lowest point of positive reckoning.

Example: + 2 means 2 more than 0.

(4) Indicating that a value is *positive* in contradistinction to *negative.* In this sense the sign is used to represent *positive* shearing stress, also to distinguish *positive* from *negative* electric current.

(5) Indicating *compressive* as opposed to *tensile* stress.

− The *minus* sign, with four meanings:—

(1) Indicating *subtraction.*

Example: 3 − 2, that is 2 taken from 3.

(2) Indicating that the value of a number is less than zero, or the lowest point of positive reckoning.

Example: − 2 means 2 less than 0.

(3) Indicating that a value is *negative* in contradistinction to *positive.* In this sense the sign is used to represent *negative* shearing stress, also to distinguish *negative* from *positive* electric current.

(4) Indicating *tensile* as opposed to *compressive* stress.

∸ A form of the *minus* sign, sometimes used in proportion.

Example: $a \dot{-} b :: c \dot{-} d$.

= The sign denoting *is* or *are equal to*, or *equals.*

Example: 2 + 3 = 5, that is, 2 plus 3 are equal to 5, or the sum of 2 and 3 equals 5.

≡ Signifying *is exactly equal to.* (A precise but seldom-used expression.)

⌓ Meaning *is equivalent to.* This sign is applied to magnitudes or quantities of equal area or volume, but not of the same form. (Rare.)

Example: $a \backsimeq bc$, signifying that a square whose side is represented by a has an area equal to that of a rectangle whose sides are represented by b and c.

× This sign stands for *multiplied by*, *times*, or *into.*

Example: 10 × 9 = 90.

. A dot, or period, between two factors, is frequently used to denote multiplication.

Example: $a.b = a \times b$.

Multiplication is also indicated by placing two factors closely together.

Example: $ab = a \times b$.

. A dot placed in front of one or more figures indicates that the quantity is a decimal fraction.

:: This sign has two meanings.

(1) Indicating multiplication. (Rare.)

(2) Signifying *so* (*is*), *equals*, or *is equal to.* In this sense the sign is used to denote proportion, or the equality of ratios.

∺ Indicates *geometrical* in contradistinction to *arithmetical* proportion. (Rare.)

Example: $a : b :: c : d$.

— *Division* is very generally indicated by placing the dividend above a horizontal line, and the divisor below the same line.

Example: $\frac{6}{3}$

÷ *Division* is also frequently indicated by this sign, which has the advantage of saving space.

Example: 6 ÷ 3.

/ *Division* is sometimes indicated by placing the dividend before a sloping line, and the divisor after the same line.

Example: 6/3.

⊥ *Division* can also be indicated by this sign. (Rare.)

: *Division* can also be indicated by two dots one above the other, but the more general application of the sign so formed is to indicate ratio.

: When placed between two symbols or numbers, this sign signifies *is to* or the *ratio* of one factor to the other. Sometimes to make sense the word "as" must be understood.

Example: 6 : 3 means as 6 *is to* 3.

∴ *Therefore*, or *hence.*

∵ *Because*, or *since.*

$\sqsupset$ *Is greater than.*

Example: $3 \sqsupset 2 = 3 \sqsubset 2 = 3$ is greater than 2.

$\sqsubset$ *Is less than.*

Example: $2 \sqsubset 3 = 2 \sqsupset 3 = 2$ is less than 3.

$\not\sqsupset$ *Is not greater than.*

Example: $2 \not\sqsupset 3 = 2$ is not greater than 3.

$\not\sqsubset$ *Is not less than.*

Example: $3 \not\sqsubset 2 = 3$ is not less than 2.

≒ *Is of the form of.*

Example: $21 \fallingdotseq (2 \times 10 + 1)$, that is, the number 21 is of the form (2 × 10 + 1). (Rare.)

~ *The difference between.* This sign is used to indicate the difference between two quantities without suggesting which is the greater.

Example: $x \sim y$, that is, the difference between x and y.

—: This sign also indicates *difference.*

Example: $x -: y$.

∝ *Varies as*, or *is proportional to.*

Example: $x \propto y$, meaning that x varies as y, or that its value depends upon the value of y.

∞ *Infinity*, *infinite*, or *infinitely great.* This sign is employed to indicate a quantity greater than any finite or measurable quantity.

° *Infinitesimal*, or *indefinitely small.* This sign has three uses:—

(1) As the numeral *naught.*

(2) As a symbol indicating *zero.*

(3) As a symbol indicating *infinitesimal*, or *indefinitely small.*

∠ *Angle.*

Example: ∠ ABC = the angle ABC.

$\wedge$ *The angle between.*

Example: A ∧ B, or A $\overset{\wedge}{}$ B, that is, the angle between the lines A and B.

> This sign is a less common sign denoting an *angle.* (Rare.)

> This is also used to denote an *angle.* (Rare.)

L *Right angle.*

Example: L ABC = the right angle ABC.

⊥ *Perpendicular*, *perpendicular to*, or *is perpendicular to.*

Examples: Draw AB ⊥ CD = draw AB perpendicular to CD; PQ ⊥ RS = PQ is perpendicular to RS.

∥ *Parallel*, *parallel to*, or *is parallel to.*

Example: Draw AB ∥ CD = draw AB parallel to CD.

∦ *Not parallel*, *not parallel to*, or *is no parallel to.*

Example: EF ∦ GH = the line EF is not parallel to the line GH.

≌ *Equiangular*, or *is equiangular to.*

Example: ABCD ≌ EFGH = the square ABCD is equiangular to the square EFGH. (Rare.)

≦ *Equilateral*, or *is equilateral to.*

Example: ABC ≦ DEF = the triangle ABC is equilateral to the triangle DEF. (Rare.)

○ *Circumference* of a circle.

⊙ *Circle.*

◠ *Semicircle.*

⌒ *Arc* of a circle.

◺ *Quadrant.*

△ *Triangle.*

□ *Square.*

▭ *Rectangle.*

° *Degrees* in angular measurement, also in thermometric measurement.

′ *Minutes* in angular measurement, and in measurement of time, and *feet* in linear measurement.

″ *Seconds* in angular measurement, and in measurement of time, and *inches* in linear measurement.

‾ *Vinculum*, placed above figures or factors meaning they are to be taken together.

Examples: $\overline{4 + 2}$; $\overline{a + b}$.

( ) *Bracket*, meaning that the figures or factors enclosed are to be taken together.

Examples: (4 + 2); (a + b).

[ ] *Bracket* enclosing smaller brackets, also meaning that the enclosed quantities are to be taken together.

Examples: [6 × (4 + 2) ÷ 3]; [e × (a + b) ÷ d].

{ } *Bracket* enclosing the preceding forms of bracket.

Examples: $\{8\,[6 \times (4 + 2) \div 3]\}$; $\{e\,[e \times (a+b) \div d]\}$

$\sqrt{\ }$ *Root*, or *radical sign*—a modification of the initial letter of the Latin word *radix.* When used without a small numeral above it, this sign indicates *square root.*

To denote any other root a small figure indicating the degree of the intended root is placed above the sign.

Examples: $\sqrt{4}$ = the square root of 4; $\sqrt[3]{4}$ = the cube root of 4; $\sqrt[4]{4}$ = the fourth root of 4; and so on.

The root of a quantity is sometimes denoted by a fraction in small characters placed after and near the top of the quantity, the denominator of the fraction indicating the degree of the intended root.

Examples: $4^{\frac{1}{2}}$ = the square root of 4; $4^{\frac{1}{3}}$ = the cube root of 4; $4^{\frac{1}{4}}$ = the fourth root of 4; and so on.

Index.—A small number or letter placed after and near the top of a quantity is termed an *index*, and indicates the power to which the quantity is to be raised.

Examples: $a^2 = a \times a$, or the square of a; $a^3 = a \times a \times a$, or the cube of a; $a^4 = a \times a \times a \times a$, or th fourth power of a, and so on.

When the index is preceded by the *minus* sign, the reciprocal of the corresponding power is indicated.

Examples: $a^{-1} = \frac{1}{a^1}$; $a^{-2} = \frac{1}{a^2}$; $a^{-3} = \frac{1}{a^3}$.

OBITUARY.

MR. SANG.—Mr. Frederick Sang, the once well-known decorative artist, died at Twyford Abbey on December 27 in his ninety-third year. He was born in August, 1813, at Offenbach, in Germany. As a young man he entered the Royal Academy, Munich, and studied architecture under Baron Gaertner. After this he went on his travels through Germany, Austria, France, Italy, Greece, and Asia Minor, and then came to England to settle. In England a special Act was passed, making him a British subject. He practised as an architectural decorator until about ten years ago, when he had to retire on account of his great age, although he was still actively working, etc., until the day of his death. Among the works which he carried out in this country were: The decoration of the Royal Exchange, the Coal Exchange, and several other buildings in the City. In the West End he decorated some of the principal clubs and also various mansions in the country and abroad. The last work he did was in 1894, when he re-decorated the Conservative Club, in St. James'-street.

MR. W. H. R. CRABTREE, Borough Surveyor of Doncaster, died on the 27th ult. at the age of forty-eight. Mr. Crabtree was born at Manchester in 1857, and was the son of Mr. Wm. Crabtree, who was for many years Borough Surveyor of Southport. After serving in his father's office, he became resident engineer of the Southport Sewage Works, and was also engaged on the

Promenade extension works. In 1879 he carried out extensive works under the late Mr. Mansergh, and seventeen years ago was appointed Borough Surveyor of Doncaster. Many important schemes and works of street improvement have been carried out at Doncaster under his direction, including the electricity works, the tramway scheme, and the erection of Corporation schools. He had just completed plans for carrying out three schemes, comprising the erection of a Municipal Secondary School, the erection of Corporation elementary schools, and a model lodging-house, at a cost of over 50,000*l*. Mr. Crabtree leaves a widow and seven children.—*Yorkshire Post.*

MR. YERKES.—Mr. Charles Tyson Yerkes, who died in New York on December 29 in his sixty-ninth year, held large interests in several railway and tramway schemes in both this country and the United States. His parents were Quakers of Philadelphia, where he was educated in the Quaker and High schools. By his own preference he began life in a very humble capacity, his first regular employment being a clerkship in Messrs. James P. Perot & Brother's flour and grain warehouse, and then as cashier, at an annual salary of 60*l*., in Philadelphia. In 1868 he became a stock-broker in that city, and three years afterwards he bought a banking business there. His fortunes were for a while adversely involved in the financial panic which followed the great fire at Chicago; and, being heavily indebted to the corporation, he was compelled to suspend payment and to make an assignment of his property. The municipal authorities did not forego the exertion of their legitimate rights as ranking amongst his creditors, and he, obliged to submit, suffered a term of civil imprisonment. Mr. Yerkes, however, speedily recovered from that disaster; in 1873 he speculated heavily in stocks of all kinds upon the downfall of Jay Cooke, the financier, and, gaining large profits from his purchases, became owner of the 17th and 19th Street Railway and similar undertakings in Philadelphia. Enlarging the field of his enterprises, he built a loop-line to connect all the elevated and other railways into one system, having an aggregate mileage of 500 miles in Chicago, and he opened a branch bank and acquired extensive railway interests in New York. With his co-capitalists he gradually acquired control of several local tramways, changing the motive power from horse to cable. Five years ago he came to London where he realised that a fortune lay in the similar conversion for passenger traffic, and, as chief promoter of the "Yerkes-Perks" syndicate, began operations for the construction of tube railways, worked by electricity, traversing London in various directions. For one of those schemes, the Baker-street and Waterloo station line, which is nearly completed, he placed the contracts with British companies and was solicitous for the employment of only British labour. He was chairman of the Underground Electrical Railways Company, who are owners and constructors of the Baker-street and Waterloo, the Charing Cross, Euston, and Hampstead, and other suburban railways, and he carried out the scheme of electrical traction for the Metropolitan and District lines. Mr. Yerkes presented the big telescope to the observatory he founded at Lake Geneva, Wisconsin, and evinced his artistic tastes in forming a remarkable collection of pictures in his residence at New York. Mr. Yerkes, who married twice, leaves a son and a widow. He bequeaths his art collections and two houses in Fifth-avenue to the Metropolitan Museum of Art; the bequest, valued at five million dollars, comprises twenty-three rugs, which, it is said, are the finest and most valuable known.

GENERAL BUILDING NEWS.

MISSION CHURCH, ST. GEORGE, BRISTOL.—The new mission church of St. Ambrose, Stretford-road, St. George, was dedicated on the 21st ult. This new church, together with the classrooms, has been erected by the vestry of St. John the Baptist, Bristol, and it consists of the mission church, which will accommodate 300, together with two large classrooms, each with accommodation for about fifty, and the necessary offices. The architect for the building is Mr. H. C. M. Hirst, and the contractors Messrs. E. Walters & Sons.

BUILDING IN DUNDEE.—With the cry that is at present very general for the creation of garden cities and the transference of people from the crowded centres of cities to outlying areas, it is curious to note that during the past year the building trade of Dundee has been given over chiefly to the construction of large blocks of tenements such as are already so numerous in the city. On former occasions certain districts of the city were more favoured than others for tenements, but this year all quarters of the city have seen large blocks of dwelling-houses erected. There are at present in course of erection in the city thirty-two tenements, twenty villas and cottages, two shops, and one warehouse. The Corporation undertook a large number of contracts during the year, the most important of which were in connexion with the scheme for providing work for the unemployed. This scheme embraced new streets or improvements on existing ones, and represented an expenditure of between 6,000*l*. and 7,000*l*. The Craig-street Markets were considerably remodelled, and shops erected on the west side at a cost of about 1,000*l*.; while wash-houses have been erected in the West End costing over 6,000*l*. The year, on the whole, has been a very steady one for the workmen, for although there has been no work of any magnitude other than the *Courier* building, the large number of tenements and villas have kept the various tradesmen well employed. There were no disputes during the year, and wages ruled as formerly.—*Dundee Courier.*

BRADFORD CENTRAL FREE LIBRARY.—On the 18th ult. the Mayor of Bradford reopened the Bradford Central Free Library after extensive alterations and rearrangements which have been carried out during the past eighteen months. The removal of the art gallery to the Cartwright Hall in the spring of last year rendered the large room hitherto used for picture exhibitions in the uppermost story of the Darley-street premises available for an extension of the Free Library, and work towards this end has been proceeding since that time. The whole building has been subjected to an entire reorganisation, an important part of the work being the adoption of artificial ventilation. The old art gallery has been divided into four sections, the part nearest the entrance being fitted as a magazine-room. A considerable part of the accommodation is devoted to the reference library, with tables for casual readers, and there are in addition two smaller rooms. The room on the floor below, divided previously between the magazine readers, the reference library, and the ladies' reading-room, has now been rearranged, and will provide accommodation for the lending library, a very much enlarged reading-room for ladies, and a work-room for the staff. The space vacated by the lending library at the side of the newspaper-room, has made an addition to the accommodation for newspaper readers. The whole building has been redecorated, and alterations of a minor character have been made. The total cost of the whole work, which has been carried out to designs by the City Architect (Mr. F. E. P. Edwards), has been about 3,000*l*.

ISOLATION HOSPITAL, AMPTHILL.—His Grace the Duke of Bedford recently opened the new Isolation Hospital which has been built in the parish of Steppingley, for the Ampthill Rural and Urban District Councils, at a cost of nearly 10,000*l*., not including the site. The new hospital, which is situated about three-quarters of a mile from Flitwick station, is a hospital for twenty beds, and for the simultaneous isolation of three diseases, which do not include small-pox, provision for that disease having been already made in an iron building about half a mile nearer Millbrook. The buildings consist of five blocks. The administration and isolation blocks enclose a hollow square, outside of which and a little to the north stands the laundry and disinfection block. Most of the front elevations have a southernly aspect. The hospital was built from the design of Mr. H. Percy Adams, and the contractor was Mr. S. Foster, of Kempston, whose foreman on the works was Mr. F. Taylor.

HIGHWAY OFFICES, LEEDS.—The new highway offices of the Leeds Corporation, which have been erected in Kirkstall-road, were opened on the 19th ult. The building has been erected by Messrs. Charles Myers & Sons, contractors, of Woodhouse, the architect being Mr. W. Bruce, of Leeds.

THEATRE, SOUTHSEA.—A new theatre is to be erected at Southsea, at the junction of Albert-road and Exmouth-road. The plans have been prepared by Messrs. Frank Matcham & Co., of London, and the theatre, to be known as the King's, will be built of fireproof materials, and lighted by electricity, and will accommodate about 3,000 persons. The principal elevation is to be towards Albert-road, and there will be a tower at the angle, with entrances to the stalls and dress circle. The doors giving access to the other parts of the house will be situated at the eastern end of the building, and between this and the tower several shops will be erected. On the Exmouth-road side there will be additional entrances and exits.

BUILDING IN HALIFAX.—During the year the Halifax Corporation Improvement Committee have had 275 plans submitted for their consideration, and 236 were approved. The latter number was made up as follows: New streets, 15; alterations to public buildings, 1; mission-rooms and schools and chapel, 6; cattle and cart sheds and farm buildings, 27; houses, 176; shop, 1; additions to domestic buildings, 31; additions to trade premises, 48; motor houses, 2; and greenhouses and minor buildings, 140. The houses certified fit for occupation number 170, and are distributed amongst the wards as follow:—Illingworth, 9; Ovenden, 10; North, 12; Kingston, 15; Skircoat, 60; Pellon, 23; Copley, 9; Northowram, 4; Warley, 3; Southowram, 1; and Akroydon, 24. The foregoing statistics have been prepared by Mr. Tylecote, Deputy Borough Engineer.

PUBLIC HALL, EPWORTH, YORKSHIRE.—A new building, to be known as the Imperial Hall, erected by a company at Epworth at a cost of 1,000*l*., was opened on the 20th ult. The hall is in Chapel-street, and comprises a public-room, with accommodation for over 400 people, and two rooms at the back, measuring 12 ft. by 11 ft., and there are two entrances, with ticket office and lobby. There is a billiard room, 30 ft. by 24 ft., with reading-room, 12 ft. by 12 ft., at the rear. The building, the plans for which were prepared by Mr. Henry Kelsey, architect, Epworth, has been erected by Messrs. Kelsey Brothers, Epworth and Goole.

BANK, HULL.—The new premises of the Halifax Commercial Bank are situated in White-friargate, Hull. The lower story, to a considerable height, is built of black Labrador pearl granite, with bands of red Aberdeen. The upper stories are of coarse millstone grit, from the Halifax district. The interior of the banking hall is panelled in teak. The floors are of granolithic concrete, finished with mosaic terrazzo and wood blocks. The architects are Messrs. Walsh & Nicholas, of Halifax. Mr. George Houlton, Baker-street, was the contractor; Messrs. J. Houlton & Sons, joiners; Mr. J. Piers, mason; Mr. W. G. Padgett, plumber; Mr. T. W. Bailey, painter; and Messrs. Williamson & Co., slaters.

THEATRE, POPLAR.—The new Prince's Theatre in the East India Dock-road was opened on the 23rd ult. The building was designed by Messrs. Owen & Ward, architects, of Birmingham; and it has been erected by Messrs. Kirk & Kirk, of Westminster. There is accommodation for an audience of 2,500. The auditorium is 78 ft. deep from the curtain line to the back of the pit, and it has a clear width of 61 ft. The stage is 60 ft. in width and 41 ft. deep from the curtain line, and the grid is 54 ft. high from stage level. At the rear are arranged the dressing-rooms, seventeen in number, heated, and fitted with lavatories with hot and cold water. The principal elevation has a frontage of 60 ft. to East India Dock-road. It is of red brick with buff terra-cotta facings, supplied by the Hathern Station Terra-cotta Company. The building is equipped with fire hydrants and appliances supplied by Messrs. Merryweather & Co. The decorations of the auditorium, which are in the French Renaissance style, have been executed by Messrs. F. De Jong & Co.

PRESBYTERIAN HALL, SIX BELLS, ABERBEEG, MON.—The memorial-stones of a new hall, which is being erected in connexion with the Presbyterian Forward Movement, were laid recently at Six Bells. The building comprises a chapel and schoolroom, accommodation being provided for 700 people in the former, and 400 in the latter. It is built in the Gothic style, of native dressed stone, faced with native polled stone and Forest of Dean stone dressings. The schoolroom will be underneath the chapel. There are galleries all around the chapel, with an organ platform arranged in the centre of the gallery at the rear of the rostrum, with a vestry underneath. The seats, rostrum, and inside fittings will be of pitch-pine, with which the ceiling will also be panelled. A heating chamber is provided under the schoolroom, and the entire building will be heated on the hot-water principle. The contractors are Messrs. D. W. Richards, Ltd., Newport, and the work is according to the designs, and is being executed under the supervision of Mr. R. L. Roberts, Abercarn, the total cost being about 2,300*l*.

BUILDING IN NEWCASTLE-ON-TYNE.—Though the past year has not been marked by the general activity that characterised some recent years, a fair amount of work has been got through. The prospect for the coming twelve months is, however, not so promising. In many parts of the centre of Newcastle business premises have undergone demolition and reconstruction, more in accord with modern ideas of light and space, and this class of work, as one can see on a perambulation of many of the central thoroughfares, is yet far from accomplished. Collingwood-street is rapidly taking rank with the best streets in regard to architectural features, and the transformation of Pilgrim-street proceeds steadily. A large amount of property has been razed to the ground in connexion with the Market-street extension to New Bridge-street, whereby the east end of the Central Station will be brought into more direct communication, and the pressure of traffic of Blackett-street and the east end of Grainger-street considerably relieved. This latter scheme was adversely criticised by Mr. J. T. Cackett in his presidential address to the Northern Architectural Association a few weeks ago, when that gentleman expressed the opinion that one of the most desirable improvements would be to add to the usefulness of Percy-street—and thus relieve Grainger-street—by either improving the approach to it or making a new

street to the north of Clayton-street. A street from the Monument to the Haymarket he also thought desirable, and he trusted the building of a free high level bridge across the Tyne would not be long postponed. The present scheme, which he regretted had been postponed *sine die*, he thought provided an admirable through route from High-street, Gateshead, to the North-road. The latest improvement undertaken by the Council—he referred to the Market-street extension—would, if properly carried out, prove one of the greatest boons to the city since the days of Grainger; for it duplicated New Bridge-street, and so might relieve it of the great amount of through traffic which so congested it now. But when they looked at the details of the scheme, it seemed to leave much to be desired; and, in his opinion, it was a striking example of shortsightedness. Continuing, Mr. Cackett said that apart from the centre line there was nothing in the scheme worth preserving, and that it had been conceived in the most parochial spirit. His criticism of the Market-street extension had tempted him to consider whether, by dealing with the matter as Grainger and Dobson certainly would have done, there was not room for a magnificent improvement to this part of the town, which would also be financially successful. The great expense of the scheme lay in the purchase of all the property between New Bridge-street and New Market-street and the old property to the south of New Market-street. With, he thought, one or two unimportant exceptions, all the property in this area was old, and there were schemes for rebuilding a very considerable portion of it. Were this property brought up and the area laid out as he had planned, they would have blocks commensurate with modern requirements, and with frontages that would command prices that would go far to pay for the scheme, even if it did not do more. He did not think the most extravagant reconstruction would produce a finer or more appropriate site for municipal buildings.—*Newcastle Journal.*

BUILDING IN SHEFFIELD.—"The year has been a bad one, but the outlook is not altogether gloomy." In this sentence an expert summed up the state of the building trade in Sheffield to our representative. Building is still keeping in front of the demand by tenants. This applies to all classes of houses, and especially to middle-class houses from 20*l.* to 40*l.* Fairly large houses which have previously been rented at more than 40*l.* are not now fetching so much. This is the more noticeable in the case of houses which are not on or near to the tram routes, while there is still a strong movement by people who have been accustomed to living within walking distance of the centre of the city to go to the more distant suburbs where the trams help them. But suburban houses that are not near the tram routes are a bad speculation. Expert opinions as to the condition of the cottage property market are conflicting. One has it that it has not been so bad in Sheffield for many years; another holds that there are not quite the number of empty houses that there were a year or even two years ago, for the simple reason that many cottage builders have cried halt, and fewer rows have been built. In any case, statistics show that there has been an inclination during the year to build half a dozen cottages instead of a dozen. The realisation of that class of property has been bad all through the year. So far as Corporation building is concerned it may be said at once that partial failure has attended the departure of building lock-up shops in the blocks of flats which have been erected in Snig-hill and Shalesmoor. The controversy which has been going on for some time as to the expense of erecting dwellings for working classes at such a rate as to enable the Corporation to let them at a rent which could be paid by the average worker, has resulted in the carrying-out of a scheme at Wincobank. Official figures obtained from the City Buildings Inspector (Mr. Green) show that while he and his staff have been fairly busy they have not had so much to do as last year. There has been a marked decrease in the number of plans deposited. Last year there were 1,530, but this year, up to December 20th, there have been only 1,288. Of these 974 have been approved, as compared with 1,093 last year. Sanctioned on those plans were 2,076 houses—451 fewer than twelve months ago. Plans have been approved for 661 buildings of a general description. Here, again, the decrease is considerable, since in 1904 there were erected 777 general buildings, and the same remark applies with even greater force to the number of houses certified. Of thse there have been 1,191, whereas in 1904 there were 1,963; while there have been 392 other buildings of a general description written off as satisfactorily completed. Last year there were 371. A large number of dangerous structures have been dealt with, and a good deal of attention has been paid to the means of exit from various public buildings and workshops. There have been comparatively few large and important buildings completed during the year. First and foremost is the University. One of the largest plans submitted during the year was that for no fewer than 57 houses in Anns, Fryerning, and Midhill roads, in the Olive-grove district. A glance at the list of principal plans submitted during the year indicated that extensive developments have been made in the church and chapel life of the city, and mission halls and parish rooms have not been at all few and far between.—*Sheffield Independent.*

THE UNITED SERVICE CLUB.—Recently it was decided to modernise and renovate the club entirely. The work carried out is as follows, viz.:—The entire re-decoration of the club from top to bottom; a large addition to the smoking-room on the ground floor, making this noble room still more spacious; the conversion of a large portion of the basement into lavatories, dressing, and bath rooms; re-drainage on the "Shone" system; electric passenger lift from basement to first floor; new heating system and additions to the cooking apparatus; additional staircases, and alterations and improvements to the kitchens, larders, and offices generally. The work has been carried out under the direction of Messrs. Isaacs & Florence, architects. The drainage system has been carried out by Messrs. Shone & Ault. The general contractors were Messrs. Aldin Bros. & Davies, of South Kensington (whose contract amounted to nearly 15,000*l.*), and the work has been carried out by them under the personal supervision of their manager, Mr. Leslie Shingleton, assisted by Mr. Robinson as their general foreman, Mr. Sutton acting as clerk of works. The Otis Elevator Co. supplied the electric passenger lift; Messrs. George Jennings the sanitary fittings; and Messrs. J. Slater the heating and cooking apparatus

THE YORKSHIRE BUILDING TRADE.—There is remarkable unanimity in the tone of the reports from the big centres of Yorkshire as to the state of the building trade during the past year. In nearly every instance the word "depressed" summarises the position. In many cases the towns are over-built, in some a slackening of municipal enterprise has had an unfavourable influence, and bad trade generally is the dominant factor. Thousands of joiners, bricklayers, masons, and plumbers are either out of work or working short time. According to the latest official returns, the percentage of trade union members unemployed among carpenters and joiners at the end of November, though smaller than last year's percentage, was 10·1. The percentage of unemployed plumbers was higher at the end of last month, being 11·1, as compared with 10·5 at the same time last year. One effect of the slackness in the building trade has been a corresponding depression in the fire-clay industry. The price of material has varied during the year. Lead has gone up in value lately, but common bricks have been rather cheaper during the last month or two. Certain kinds of timber have fallen in price, but generally speaking this class of material is dearer than it was a few years ago. As to the future, there is generally a more hopeful tone, and it is anticipated that the present year will be more active than the year that has passed. This feeling is entertained in Leeds. Here 1905 has been a very uneventful year. A few large schools have been completed or commenced. But big schemes of any kind are very scarce; the most important is the new sewage scheme which the Corporation have just decided upon. The number of empty houses in the city—reckoned by thousands—does not encourage speculative building. Never in modern times, it is said, have building operations been so scanty in Bradford, but in the Huddersfield district a good number of cottages and middle-class houses have been put up. A few new mills and weaving sheds have also been erected, and extensions of mills have been carried out in Huddersfield and the Colne and Holme Valleys. It is probable, however, that but for the extensive buildings that are being put up at the West Riding Asylum at Storthes Hall short time would have had to be resorted to. Many men in Hull are out of work, and the amount of unlet tenement property is a very disquieting feature of the situation. Good progress is being made with the new law courts, and the second portion of the new City Hall is pretty well advanced. From Hull to Halifax is not a far cry, and a similar story of slackness is told in the West Riding town. The new Halifax Theatre Royal having been finished, no new large buildings are rising. Not much speculative building of houses is going on, but there will be more activity in this direction early in the new year. The two large contracts in the York district—the North-Eastern Railway offices and the new Asylum at Naburn—are completed, and with one exception there has been no work of the warehouse type. Extensive private street works have been undertaken, but the building of cottage property and private residences has been reduced to a minimum. In the latter respect Harrogate has a rather different tale to tell, a fairly large amount of medium and cottage property having been built in the popular watering-place. It must be remembered that about a thousand new houses have been built since 1901, about 125 of them during the past year. The new Free Library is practically completed. There is considerable work in hand in the conversion of private property into shops and business premises. Here, as elsewhere, the year ends with a brightening prospect.—*Yorkshire Post.*

BUILDING IN ABERDEEN.—The past year has not been prosperous for the Aberdeen building trade. The revival that is taking place in the general industry of the country has not yet begun to make itself felt in the trade, and 1905 must be regarded as one of the very lean years in the experience of Aberdeen builders. So far as prospects for the immediate future are concerned, it cannot be said that the outlook is at all cheerful. It is the misfortune of builders that their trade is ever the first to be hampered by any serious depression in the industry of the country, and is ever one of the last to be reached by the returning wave of prosperity. In Aberdeen, building has passed through a variety of experiences during recent years; time was, and that not so long ago, when the city was famous for the amount of speculative building that was carried on within its bounds. The results of this craze were soon seen, when the city became overbuilt and many speculators suffered, and, judging from the past year or two, it was seen that the speculative building mania has practically entirely subsided. The number of plans passed by the Town Council during the year is the smallest that has been before them for about fifteen years, so that unless a very decided change for the better is experienced during this year, it is probable that the builders of Aberdeen will have another twelve months of dull trade to look forward to. The most important mason-work contract that has been completed during the year is the Marischal College extension.—*Aberdeen Free Press.*

EDINBURGH BUILDING TRADE.—The building trade has not by any means been in full swing, and as a consequence a large number of artisans and labourers have been idle, and many of the large building yards in the city have been practically like deserted villages. It was expected with the introduction of machinery into these yards that manual labour would be largely diminished, but even the machines have had their term of inactivity during the year. The most important buildings which have passed through the Dean of Guild Court are as follows:—For the School Board were the new schools at Drummond-street and Gilmore-place, additions to Students' Union, Park-place; new church, M'Donald-road, for the Rose-street United Free; extensive additions to and alterations of the old Infirmary buildings for the University; the King's Theatre, Tarvit-street; a large new warehouse in Elder-street for Messrs. Ritchie & Co., and additions to Messrs. Nelson & Sons' Printing Works, Parkside. Undernoted is a record of the work of the Dean of Guild Court work for the year and a comparison of the previous year. The total for the year represents a value of 656,015*l.* Embraced in this amount were 713 warrants for 62 tenements, 51 villas, 260 self-contained houses, 132 public and other buildings, and 492 alterations. In the foregoing tenements were 19 shops, 19 houses of 1 apartment, 118 houses of 2 apartments, 147 houses of 3 apartments, 190 houses of 4 apartments, 30 houses of 5 apartments, and 9 houses of 6 apartments, representing a total number of 513 tenement houses. For the corresponding period last year the total work represented a value of 977,883*l.*, representing 832 warrants for 67 tenements, 71 villas, 212 self-contained houses, 123 public and other buildings, and 583 alterations. In the tenements were 8 shops, 37 houses of 1 apartment, 266 houses of 2 apartments, 218 houses of 3 apartments, 156 houses of 4 apartments, 23 houses of 5 apartments, and 9 houses of 6 apartments.—*Scotsman.*

STONE AND BUILDING TRADES, SHIPLEY.—During recent years there has been a great deal of building done in Shipley, and each year as it has come round the opinion has been expressed that the place was being over-built. Yet of all the hundreds of new houses erected in that short period few have remained long unoccupied. The past year has been considered a comparatively quiet one in this direction, and yet 100 new houses have been entered upon the rate-books. In the past the great bulk of the new houses erected have been of the terrace class, with rental values ranging from 19*l.* 10s. upwards. Latterly, however, a strong demand has arisen for semi-detached and detached houses, surrounded by a little private ground, and selling at 600*l.* or more. A considerable number of these have been erected or are in process of being built. Out of the hundred houses forty-four are in the West Ward, and are all of a large size, while thirty-four, of a little less value, have been erected in the South Ward. Twenty cottages have been built in the East Ward. Notwithstanding what has been said about the increase in houses, the stone trade has only been moderately busy, and prices have been low.

THE BUILDING AND STONE TRADES, BRADFORD.—The depression in the Bradford stone and building trades, which in 1904 was said to have reached a point unknown for nearly twenty years, has

been still more serious during the year which has just ended. "There is no doubt," says the representative of a prominent firm, "that 1905 will be regarded as a year of almost unparalleled inactivity. The present generation of builders and contractors do not remember ever before to have passed through such a period of severe depression." No large contracts have been let either for public or private buildings, and comparatively few small ones. Of contracts let there may be enumerated the hospitals at the Bradford Workhouse, consisting of blocks for maternity and children's cases, the cottage homes at Daisy Hill, the Crematorium at Scholemoor Cemetery, Hanson School extension in Barkerend-road, and the basement for the Town Hall extension. The Bradford Dyers' Association have done a good deal of reconstruction and made additions at many of their works. Other private building enterprises include a wool store in Sunbridge-road, box works off Manningham-lane, a warehouse in Canal-road, shop premises in Darley-street, an extension to dyeworks in Cemetery-road, and new truck works in Preston-street. Owing to the tremendous number of empty houses in Bradford, the speculative trade has been very poor, and although many fewer houses have been put up than was the case last year, more appear to have been built in some districts than the demand has warranted. Toller-lane district is still being developed, and at the top of Undercliffe and at Little Horton a good deal of house building has been going on. The hope is entertained that the depression has reached its lowest level, and that an improvement in the staple trade of the city may bring in its wake better times for the building and allied trades. One class of building materials—bricks—has remained at a stationary price, but it is significant of the state of trade that only about half the brickworks in Bradford have been kept running. Quarries in various parts of Bradford are shut down for the reason that the quarry-hills are overstocked. Whilst the local trade in stone has been worse than in former years, prices having had a lowering tendency, the London and Midland trade has also fallen off considerably. Prices have ranged somewhat as follows:—Self-faced flags, 1½ in., 1s. 6d. to 1s. 8d.; 2 in., 2s. to 2s. 2d.; 2½ in., 2s. 6d. to 2s. 9d.; 3 in., 3s. to 3s. 4d. per super yard. Tooled flags, 2½ in., 4s. to 4s. 4d.; 3 in., 4s. 2d. to 4s. 6d. per super yard. Ashlar, 1s. 6d. to 1s. 9d. per foot cube. Outside wallstones, 38s. to 42s. per rood; inside wallstones, 18s. to 21s. per rood; pitch-faced wallstones, 38s. to 42s. per rood.—*Yorkshire Observer.*

BUILDING IN MANCHESTER.—Several housing schemes have had the attention of the Manchester City Architect's Department during the year. A site for one has been purchased in Hulme, and sketch plans for its utilisation are in course of preparation. Tenements have been erected in Rochdale-road, at the corner of Sudell-street and Moore-street. The elevation to Rochdale-road is a good example as a commencement of improved buildings in that thoroughfare. The much-criticised "barracks" appearance is avoided in the treatment. Accommodation for sixty-four families in tenements of two and three rooms has been provided, and a corner of the site, which could not be thus utilised, has been covered by two shops, with work-rooms over. Land in Barrack-street has been purchased, and application has been made to the Local Government Board to sanction the borrowing of money for the building thereon of workmen's dwellings. Several works have been carried out during the year by the Parks and Cemeteries' Committees, the Markets Committee, and the Fire Brigade Committee.

BUILDING IN GLASGOW.—The year just closed has not been a prosperous one for those trades connected with the building industry. For several months they were all affected by a large number of the operatives in two of those trades stopping work with the view of resisting a reduction of wages, and other differences arose between those connected with the Employers' Union and the Union of Employees in reference to working by-laws. There has been a considerable falling off in the number of applications to the Dean of Guild Court of Glasgow for new buildings, as well as in the value of all classes of property, in contrast with previous years; indeed, the value is the lowest since 1896. No doubt the reason for this has been that within the city the supply is sufficient for present requirements. The large amount of building of dwelling-houses which is in progress in the suburban districts of the city has also to be taken into account. These houses in most cases become occupied as soon as they are ready, showing that there is a growing disposition to migrate from the city to the suburban districts. Nor is there any doubt but that suburban houses will continue to be supplied so long as the demand exists. There are other reasons for the decline in building operations in the city. Speculative building, for instance, is for the present practically at a standstill, for in every district of the city empty houses are to be seen, while many of the older properties of the warehouse class have either been entirely demolished and re-erected into handsome buildings or otherwise altered to suit the more modern requirements. The total valuation of the new property which came before the Dean of Guild Court this year is 1,439,434*l.*, as against 2,118,800*l.* for the previous year. During the year there were ninety-two linings granted for houses and shops with a valuation of 582,853*l.*, against eigty-three linings in the previous year, the valuation being 621,400*l.* There has been a considerable increase of houses of one and two apartments in the eastern district as compared with last year, viz., 1,403 houses as against 999, being the highest in any district of the city. Queen's Park comes next with 426 houses, and Maryhill district third with 279 houses. No dwelling-houses have been erected in the southern or northern districts. As already mentioned, the greater falling off is in buildings of the warehouse class, for which 125 linings were granted, the valuation being 376,715*l.*, as against 131 linings and a valuation of 828,720*l.* in the previous year. There were twenty linings for public buildings with a valuation of 103,515*l.*, against eighteen linings and a valuation of 248,060*l.* for the previous year. For churches, halls, and schools ten linings were granted, compared with eleven linings last year, the valuation being 72,400*l.*, while for alterations and additions there were 221 linings against 276, the valuation being 303,951*l.* against 307,070*l.* For new streets there were sixteen linings against twenty-one, the length in yards being 3,298 against 5,891 in the previous year. While there has been a considerable falling off in the erection of all classes of buildings, it is encouraging to note that the ordinary building trades are fairly well employed. The large decrease in operations will, it is stated, principally affect those who have been building for speculative purposes.—*Glasgow Herald.*

BUILDING IN LEEDS.—Between March 25 and November 29 last 1,172 houses have been erected in Leeds, of which 565 are through, and 522 back-to-back houses. In the same period 973 miscellaneous buildings have been completed. At the present moment 952 houses are in course of erection, of which 529 are through and 352 are back-to-back houses. The number of miscellaneous buildings now being proceeded with is 737.

LEITH BUILDING TRADE.—The building trade in Leith during the past year has been in a depressed condition, and there are no signs of work becoming brisker for some time to come. During the year forty-one warrants were granted by the Dean of Guild Court for new buildings, in addition to fifty-nine warrants of a minor character. The total value of these buildings is estimated at 92,000*l.* This compares unfavourably with the two previous years, the value of the buildings in 1904 having been 180,000*l.* and in 1903 269,000*l.*

SCHOOLS, HAWKLEY.—New Church of England schools have been built at Hawkley at a cost of 1,000*l.* They were erected from the plans of Mr. H. T. Keates, architect, of Petersfield, by Mr. Marshall, builder, of Liss.

PROPOSED WORKMEN'S INSTITUTE, ROSHERVILLE.—A workmen's institute is to be erected on a site between Beresford-road and Burnaby-road, Rural Vale, Rosherville, from plans prepared by Mr. Clay. The building will contain a reading-room and card-room on either side of the entrance, a central hall, and the usual offices, provision for the caretaker's apartments being made on the upper floor.

THEATRE, WOOLWICH.—On December 21 last Earl Roberts opened the new Royal Artillery Theatre at Woolwich. The building has been erected on a site facing Woolwich Common at a cost of 11,000*l.* Mr. W. G. R. Sprague was the architect of the work.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW, ST. FRIDESWIDE'S.—A memorial window has been unveiled in the parish church of St. Frideswide's to the late Rev. A. J. Miller. It was designed and executed by Mr. Herbert Davies, of North Finchley. The subjects are in painted glass, and the three central lights represent the Crucifixion, the light on the north side "The Nativity," and on the south "The Adoration of the Magi."

FOREIGN.

TIMBER RESOURCES OF NEW ZEALAND.—According to a report on the timber industry just issued by the Lands Department of the Colony, the estimated quantity of milling timber on Crown lands in 1904 was 20,000,000,000 superficial feet of all classes of timber, whilst, on a very rough estimate, there were 21,000,000,000 superficial feet on private and native lands. The saw mills of the colony number 414, with an aggregate of 9,497 horse-power; cutting capacity per annum, 704,930,600 superficial feet; output per annum, 413,289,742 superficial feet; number of hands employed, 6,912.

ARGENTINA.—A despatch received at the Foreign Office from H.M. Consul at Buenos Ayres (Mr. A. C. Ross) states that there is a large amount of building going on in that city on account of private individuals, but it is improbable that any of the projected municipal works which require skilled workmen will be undertaken in the near future. Bricklayers and carpenters, it is reported, do just as they please about working or resting, and contractors are very chary of binding themselves under contract.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. William H. Thorp, architect, has removed his office from 61, Albion-street, to Phœnix-chambers, South-parade, Leeds.

CROWN LANDS.—A departmental measure has been prepared for the ensuing session to authorise the Commissioners of Works to convey bridges under their management to bridge authorities who are willing and able to accept such conveyances, and to transfer the management of Richmond and Kew greens to the Richmond Borough Council. The Bill provides further for the improved management and regulation of the New Forest, and for vesting the verderers with increased powers to prohibit the discharge of sewage, the placing of refuse, rubbish, etc., and the erection of booths and encampments upon the forest lands. Other clauses of the Bill relate to powers for authorising the transfer of any foreshore under the control of the Commissioners of Woods to the management of the Board of Trade, and *vice versa*, and for authorising the Commissioners of Woods, the Board of Trade, and the Chancellor and Council of the Duchy of Lancaster respectively, to enter into agreements for compromising claims to foreshore.

COPYRIGHT IN WORKS OF ART.—The *Cape of Good Hope Government Gazette* contains the terms of the "Copyright in Works of Art Act, 1905," passed in the last session of the Cape Parliament. As regards the importation and sale of copyright works of art, it is provided by sect. 6 that "if any person, not being the proprietor for the time being of the copyright in any work of art, shall without the consent of such proprietor make or cause to be made any copy, reproduction, repetition, or colourable imitation of the work in which such copyright exists, for sale, hire, exhibition, or distribution, or shall knowingly sell, let to hire, exhibit or distribute, or cause to be sold, let to hire, exhibited, or distributed any copy, reproduction, repetition, or colourable imitation made without such consent, or shall import, or cause to be imported, any copy," etc., "such person shall be liable to an action for damages for infringement of the copyright, and all such copies shall be forfeited to such proprietor." Works of art, as defined by the Act, include sculpture, paintings, drawings, and photographs.

ST. JOHN'S CHURCH, HULL.—It is proposed to acquire the site of the church of St. John the Evangelist and of Osborne-street mission-rooms for the erection thereon of offices for the tramways of the Corporation, and the disposal of the remainder of the ground for general building purposes. The church was built, in 1790-1, of red brick with stone dressings; the pinnacled tower was erected a few years afterwards, and the chancel was added in 1866. It became a parish church in June, 1868, and contains 1,600 seats.

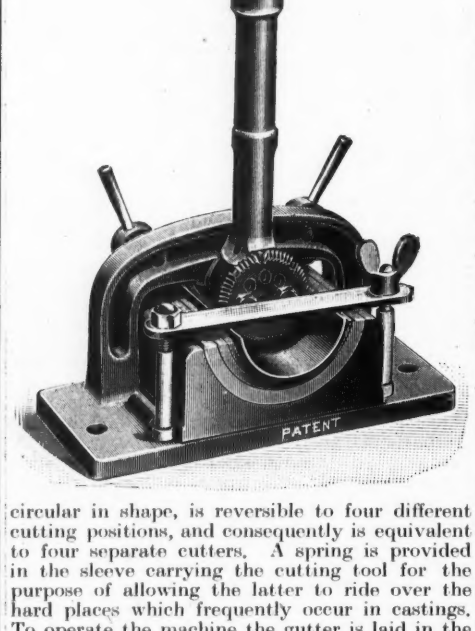
THE NATIONAL COLLECTIONS OF PICTURES AND PORTRAITS.—Amongst the recent additions to the National Gallery of British Art, Millbank, are "The Shrine of Edward the Confessor," by David Roberts, R.A.; "Cottage at Hambledon," by Myles Birket Foster; and "A Street in Antwerp," by Samuel Prout—bequeathed by Mr. Charles Fraser. The trustees of the National Portrait Gallery have accepted as a gift of the artist Mr. H. R. Hope-Pinker's portrait bust of the Right Hon. William Fawcett, M.P., and have purchased the original portrait, in crayons, of William Cowper drawn by Romney in August, 1792; Gainsborough's portrait of John Joshua Kirby, writer on perspective, and President of the Incorporated Society of Artists (*obiit* 1774); portraits by Kneller of Charles Talbot, Duke of Shrewsbury, Secretary of State, etc., and Richard Graham, Viscount Preston, statesman and diplomatist; and Lely's portrait of Admiral Sir John Harman. The portraits will be exhibited in the galleries as soon as the trustees have sufficient funds at their disposal for the purpose. The trustees of the Chantrey Bequest have bought C. W. Furse's "The Return from the Ride," F. E. Cowper's "St. Agnes in Prison," H. Speed's "The Alcantara, Toledo," E. Bundy's "The Morning of Sedgemoor," J. Aumonier's "The Black Mountains," and E. Alexander's "Peacock and Python."

THE BRITISH FIRE PREVENTION COMMITTEE.—During the year 1905 the membership of this Committee has increased by 75, and the number of subscribers (non-members) by 35. The Committee, during the year, moved its testing station to Regent's Park and equipped it with additional testing chambers, etc., the removal and extensions involving a fresh capital expenditure of

over 1,100*l*. The testing operations for the year have increased from 6 to 17. During these 17 testing operations, the following subjects have been under investigation: Four floors, 1 ceiling, 4 partitions, 1 wall, 4 column encasements, 6 window openings, and 4 skylights glazed with special glazing, 2 doors, 1 shutter, 7 concrete aggregates, and 1 fire alarm system. Fifteen "Red Books" have been issued, also two numbers of the Committee's *New Journal*. A competition for the production of a useful fable for children, setting forth the dangers of playing with fire, has been dealt with. The meetings of the Executive during the year numbered 14; of its General Purposes Sub-Committee 8, and of the General Testing Arrangements Sub-Committee 8. Further, 17 special sub-committees were appointed to deal with individual fire tests.

THE LABOUR MARKET IN THE COLONIES.—The January circulars of the Emigrants' Information Office, 31, Broadway, Westminster, S.W., state that it is too early in the season for the ordinary emigrant to go to *Canada*, unless he goes to friends, or has sufficient means to keep himself till the spring. In *New South Wales* there is a demand for skilled miners, but there is not much demand for mechanics. In *Victoria* there is no demand for more labour at Melbourne or other towns. There is little demand for more labour in country districts. In *South Australia* the labour market is fully supplied, and speaking generally, no working man is advised to go there unless he is specially skilled in his trade, or has friends to go to, or sufficient money to live on at first. In *Queensland* there is not much demand for emigrants other than skilled farm labourers, unless they have received cheap nominated passages through friends in the State, or have means of their own. In *Western Australia* the returns of the Department of Labour at Perth for the quarter ending September 30, 1905, show that there is no demand for men in the building and other trades, and at Kalgoorlie, Perth, and one or two other places, the supply exceeds the demand. In *Tasmania*, miners and mechanics on the west coast are fairly well employed, but the local supply is as a rule sufficient. In other parts of the State there is no general demand for more mechanics, but there is an opening for them if they have sufficient money to keep themselves at first. In *New Zealand*, single men who can push their way into the country need not be out of employment, work of all sorts offering in the season, such as shearing, bush work, road-making, fencing, general farm work, etc. Competent workers in the building trades, plumbers, and blacksmiths should be able to secure employment at this season without difficulty. No one may enter *Cape Colony* unless he possesses 20*l*. on arrival, or has secured work beforehand. The labour market in the building, engineering, and other trades, though the demand for men has improved, is still fully supplied, and a great many unqualified mechanics and labourers at Cape Town, Port Elizabeth, East London, King William's Town, Aliwal North, Cradock, and other places are unable to find work. Most of the men out-of-work in the different trades are either unemployable, or are second-rate workmen; first-class men on the spot can almost always find places. But there is very little opening for mechanics (especially house carpenters or bricklayers) from this country, unless they go out to situations engaged for them, or have means of their own sufficient to keep them for some months, and in any case there is no opening for indifferent workmen or unskilled labourers. In *Natal* at present labour is plentiful, and some carpenters and bricklayers, and especially unskilled workers and indifferent mechanics, are unable to obtain employment. Plasterers' wages have been reduced 1s., and now stand at 15s. a day. No one, therefore, should go to Natal at the present time unless he has means of his own, or is nominated by friends in the Colony. *Transvaal*.—No one may enter the Transvaal without a permit; no permit is granted to any one who does not possess 20*l*. on arrival, or has secured *bona-fide* employment beforehand. Affairs in Johannesburg and the Transvaal generally show no signs of improvement; almost every trade complains of stagnation, and a considerable number of persons are receiving relief. The cost of living, especially for a married man, is very high. Trade in Pretoria is reported to be very dull, and labour to be plentiful. *Orange River Colony*.—No one may enter the Colony without a permit and no immigrant can obtain such permit unless he possesses 20*l*., or has obtained *bona-fide* employment in the Colony. There is no opening for more labour at the present time.

THE "GRANVILLE" PATENT GUTTER-CUTTER.—Contractors who have to fix cast-iron gutters, and iron merchants who deal in guttering, should appreciate the simple machine illustrated on this page. The appliance was originally devised for his own use by a practical plumber, with the object of avoiding the cost of cutting by the ordinary method, and the frequent waste of material occasioned by breakages when half-round gutters had to be cut to length. It is equally valuable in iron warehouses, as by its aid odd and broken pieces of gutter can be cut square for sale instead of being consigned to the scrap heap. Upon the bedplate of the machine a hollow saddle block is fitted of suitable size for receiving the largest size of gutter ordinarily made, and the saddle is supplied with loose half-round packing pieces, so that the smaller sizes can be held in position. The cutter, which is



circular in shape, is reversible to four different cutting positions, and consequently is equivalent to four separate cutters. A spring is provided in the sleeve carrying the cutting tool for the purpose of allowing the latter to ride over the hard places which frequently occur in castings. To operate the machine the gutter is laid in the half-round saddle, or in the packing pieces inserted therein, and fixed in position by means of two cams on one side, and by a bar with wing nut on the other side. The cutter is then fed down to its work by the star wheel on the handle until sufficient cut is put on, and then the gutter is cut through by working the handle backwards and forwards, the tool operating on each movement. The weight of the machine is less than 50 lb., and by its aid any gutter castings can be cut off square and clean without the least risk of breakage.

HONOURS FOR A SURVEYOR.—On the occasion of his retirement, after thirty years' service, Mr. Frederick Simmonds, deputy-surveyor of Windsor park and forest, was decorated, on December 29, with the Fourth Class of the Royal Victorian Order and at the same time received a cheque for 500*l*. with an illuminated address and other gifts from residents and servants on the King's estate.

IRON AND STEEL.—Messrs. Matheson & Grant's thirty-first annual Engineering Trades' Report states that pig iron has gradually advanced in value during the past year, and is now high enough to upset the price-lists of many manufacturing engineers. The enormous stocks held by warrants always render forward purchases speculative, but trade prospects seem to justify the present current rates. Steel plates and beams rise and fall in value mainly in accord with the demands for ship-building, and the present activity at the rolling-mills is assured for some time to come. Recent amalgamations among steel-makers tend to economy in manufacture, and it is now claimed that nowhere in Europe or America can rolled steel be produced so cheaply as in the North of England, and that Spanish or other foreign ores are only contributing to the main sources of material, namely, Middlesbrough ore and Durham coke. The demand for steel rails has increased sufficiently to justify the present improved prices when assisted by tacit agreement among makers. The trade in structural steelwork has only slightly improved during the year, for although there is a steady advance in the prices of material, the aggregate tonnage of finished work ordered has been below the manufacturing capacity available. The very great depression in the building trades throughout the country has necessarily limited the use of iron and steel work, and the export demand for steel bridges has not been brisk enough to make up for this slackness at home. The recent failure, with loss of life, of a portion of the iron roof over Charing Cross station need cause no alarm in regard to roofs in which proper and available precautions are taken. A faulty weld, aggravated by rust, was the apparent and probable cause. Welds can and should be avoided in such structures; and so should even smith's work where steel is the material. Easy and convenient access should be provided to all parts for examination, and no part exposed to the air should be beyond the reach of the painter's brush. Unfortunately, however, there are too many structures in which the designers seem to consider only the primary purpose of a roof covering strong enough to withstand stresses from wind and snow, and in which no allowance is made in the factor of safety for the contingency of waste by rust. All these precautions are even more necessary in modern steel structures, than when the bars or plates were rolled from puddled iron, of which the Charing Cross roof was constructed forty years ago.

THE PLUMBERS' COMPANY.—At the quarterly meeting, held at the Guildhall last week, the following operative plumbers were admitted to the Freedom of the Plumbers' Company on having passed the Company's examinations in the technology of plumbing and workmanship in the Honours Grade. Their ages range from twenty-two to thirty-two:—F. G. England, R.P., of Sunderland (trained at the Cheltenham Technical School); F. J. Fearns, of Manchester (winner of two scholarships under the Lancashire Education Committee, tenable at the Company's special course of advanced instruction for plumbers at King's College, London); Alexander Forbes, R.P., of Aberdeen (was a student at Robert Gordon's College, Aberdeen, where he is now teacher of the plumbing classes); William Morris, R.P., of Southport (winner of scholarships under the Lancashire Education Committee tenable at the Company's special course of advanced instruction for plumbers, held at King's College, London. Winner of second prize in the prize competition for workmanship held under the auspices of the Lancashire Education Committee and the Company in 1904); Hargreaves Riley, R.P., of Accrington (winner of several scholarships under the Lancashire Education Committee tenable at the Company's special course of advanced instruction for plumbers at King's College, London); J. Tolmaer, R.P., of Blackpool (winner of several scholarships under the Lancashire Education Committee tenable at the Company's special course of advanced instruction at King's College, London); and E. J. H. Upham, of Cardiff (trained at the Cardiff Technical School. Winner of several local scholarships). The Master of the Company, Mr. W. D. Caröe, in congratulating the new Freemen on the result of their work, urged them to remember they were obtaining no sinecure by their admission to membership of the Company, as they were binding themselves by its old oath of allegiance to maintain its best traditions of good craftsmanship and loyal citizenship wherever their work might be done.

Legal.

DANGEROUS BUILDINGS.

AT Marylebone Police Court recently, before Mr. Plowden, were two summonses, issued at the instance of the London County Council, against the owners of business premises at 168 and 170, Edgware-road, W., for failing to comply with an order of the Council to take down the back walls where loose, cracked, or otherwise defective, the structures being in a dangerous state. Mr. Collman, who prosecuted for the Council, explained that the proceedings had been instituted at a day's notice as it was a matter of great urgency. Already about a ton and a half of bricks, etc., had fallen while workmen were engaged on the premises; and it was feared that unless something was done to the walls serious and perhaps fatal consequences would ensue. Mr. Arthur Ashbridge, the District Surveyor for Marylebone, said the danger arose through the taking away of the lower portion of the walls for the purpose of putting in a girder over the shop fronts. Originally both the front and the back walls were in a very dangerous condition, and he had no doubt that if he had not interfered the front walls, at any rate, would have been the cause of a serious accident. That wall, however, had now been secured; but the back was still in a perilous state, and unless it was more securely shored or pulled down an accident might happen at any moment. Mr. Plowden: What is the danger you apprehend? Mr. Ashbridge: The wall may give way, and if it does the fifty men employed there are bound to meet with serious accident. Mr. Plowden: You do not think they are aware of the danger they are running?—a miniature Charing Cross. Mr. Ashbridge said he had both matters in hand, and he was far more anxious about this than about Charing Cross. The defendant (Mr. Edward Burns) denied that the walls were dangerous, and was supported in his denial by his builder and his architect, Mr. J. W. Stevens, who complained that the District Surveyor had practically taken the matter out of his hands for three weeks. The builder expressed the opinion that the buildings were 140 years old. Mr. Plowden said that, if this had been an ordinary case in which the experts on either side differed, he should probably have dismissed it. But in view of the serious statement of Mr. Ashbridge, the District Surveyor, that the walls were in imminent danger

of falling and injuring a number of workmen employed there, he felt he ought not to be a party to such a possibility ; and he preferred, therefore, to be in the wrong with Mr. Ashbridge, if he were wrong, than in the right with the defendant. He therefore made an order for the walls to be immediately secured to the satisfaction of the District Surveyor.—*Times.*

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

27,815 of 1904.—W. F. PROPERT : *Boiler for Heating Water for Domestic and other Purposes.*

This relates to boilers for heating water for domestic purposes, and consists of an outside shell of the boiler made of sheet metal, corrugated or fluted as may be desired, either longitudinally or vertically in relation to its axis. Inside the boiler is fitted a fire-box, which fire-box is made conical with the larger end towards the bottom of the shell of the boiler and may form part of the shell of the boiler, or it may be fixed into the boiler by riveting, bolting, or by any suitable means, and may be of any required outline, that is to say, it may be fluted or corrugated either vertically or horizontally or in any angular direction.

556 of 1905.—F. C. PULSFORD : *Steam Heating Apparatus.*

This relates to a steam heating apparatus comprising in combination a radiator, a hand-operated steam admission valve therefor, a cut-off valve the diameter of which exceeds that of the admission valve by an amount proportional to the difference in the lifts of the two valves, a rod or tube located within the radiator and fixed at one end thereto so that when heated by steam it expands in the direction of its other end to operate the cut-off valve, and a spring located between the latter and said rod or tube to prevent the valve being forced with undue pressure on to its seat, due to negligence or failure of the reducing valve in the steam supply pipe.

6,167 of 1905.—W. F. STANLEY and W. F. STANLEY & Co., LTD. : *Perspective Drawing Tables.*

This relates to a perspective drawing table, and consists of a suitable standard for supporting the table top, preferably terminating with three feet, which is provided with a screwed pillar working inside the outer pillar connected to the three feet and a nut provided with handles to raise and lower the said screw pillar and also the said screw to lock the screw pillar when in the desired position. To the top of this screw pillar a hinge piece is fitted and a radial arm to lock said hinge piece at any desired angle. To this hinge piece the board is fastened.

6,633 of 1905.—J. SHANKS : *Valve Closets.*

This relates to a valve closet, constructed with the usual valve or valves for direct downward discharge, and with a swinging vertical lever for operating said valve or valves, having its lower horizontal arm engaging the valve levers encased by a detachable cover, allowing freedom of movement of the handle and accessibility to the working parts thereby enclosed and protected.

12,683 of 1905.—R. FLEMING : *Lifts for Use as Fire-escapes and the like.*

This relates to a fire-escape or lift of the kind in which the elevator platform is raised by means of an extensible standard on the lazy-tongs principle and a fluid actuated telescopic standard, rods located within the extensible standard and forming a pivoted connexion between the lengths of the telescopic standard and the connecting cross rods of the extensible standard.

13,651 of 1905.—J. S. YOUNG : *Tools for Cutting Stone.*

This relates to a stone saw and consists of a series of thin flat blades vertically arranged at intervals between two bars which form the back or body of the saw, bolts or screws clamping the bars together, means for simultaneously operating the bolts or screws, and means for securing the bars in the reciprocating frame of the machine.

18,160 of 1905.—A. BELL : *Ranges or the like Fireplaces.*

This relates to ranges or like fireplaces, and consists in the flue being formed and made in one with the casting of the cover plate at the back of the range—that is to say, the said plate is set back or channelled from its front face in the shape of the required flue, which at its lower part or junction with the oven is made about as wide as the oven itself, but tapers in width to a narrower exit at the top of the said plate, and at the same time deepens as it reaches the top so as to give approximately the same superficial area at the top as at the bottom. The cover plate is then provided, which by means of screws or other convenient fastenings, may be readily secured upon the front of the said flue. The soot doors and dampers may be provided as required.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

18,247 of 1905.—H. A. GEORGE : *Safety Catches for Window Sashes.*

This relates to a safety catch for window sashes and consists of a loose tumbler or bolt pivotally mounted on a round stud and projecting from the vertical plate of an angular open cane, the horizontal plate of which is furnished with holes for the attachment of the whole to the upper surface of the frame of the lower sash, the head or tongue of said tumbler being heavy and resting normally in an inclined position against the vertical side of the frame of the upper sash, and tending to fall on a raised support fixed to the bottom of the case by the potential energy of gravity in such manner that the upper part of the said tongue shall project beyond the vertical plane of the near surface of the frame of the upper sash.

20,061 of 1905.—T. HATTERSLEY : *Kitchen Fire Ranges.*

This relates to a kitchen fire range and consists of means for fixing a horizontally extending adjustable shelf by constructing the said shelf with rearwardly extending arms having upstanding hooks or equivalents at their ends, the arms being adapted to pass in between the sides of the bar frame, and to take under lateral projections on the inner surfaces of the said sides, while the hook parts pass behind said projections, the parts of the shelf extending beyond each outer side of said arms entering slots formed in flanges projecting forwardly from the bar frame, whereby such shelf is not dislodged by being drawn forwardly while it is supported horizontally by a long supporting base at each side.

20,651 of 1905.—J. WHITE : *Flushing Cistern.*

This relates to a cistern having a main flush and an after flush, and consists in the main flush being operated by the raising of a conical valve off the discharge outlet whilst the after flush works siphonically.

1,188 of 1905.—J. SMITH : *Siphon Flushing Arrangement for Cisterns.*

This relates to a siphon flushing arrangement for cisterns having siphon bend which can be tilted, said bend being pivoted near the bottom of its one leg to a bolt secured to the bottom of the cistern and at the bottom of its other leg is provided a rubber sleeve which is fixed to the grooved part of the leg by an interlocking bead and groove and is also coned or curved inwards on its under side and provided with a stiffening ring so as to close tightly into the mouth of the outflow pipe which is flared for its reception.

7,183 of 1905.—T. W. DEBNEY : *Joints for Uniting Soil Pipes to Closet Basins or Traps.*

This relates to a joint for uniting soil pipes to closet basins or traps, and consists in the formation in the end of the mouth of the closet basin or trap of a number of holes or recesses of suitable shape, and in fixing therein by means of jointing material correspondingly shaped tapped metal plugs.

7,380 of 1905.—W. SMITH, R. S. SMITH, C. S. WALKER, E. R. SMITH, and D. R. MAYHEW : *Fireproof Ceilings and Floors.*

This relates to a fireproof structure for ceilings and floors, and consists of a metal skeleton framework made up of girders having circular apertures in the webs thereof, and joists of tubular form rigidly fastened at both ends in the apertures in the webs of the girders.

MEETINGS.

FRIDAY, JANUARY 5.

London Institution.—Professor Vivian B. Lewes, on "Our Atmosphere and its Wonders," illustrated by experiments. 4 p.m.

MONDAY, JANUARY 8.

Royal Institute of British Architects.—General business meeting. (1) The chairman to move "That the Council be instructed to enter into negotiations concerning a site for new Institute premises, and to report to a general meeting." (2) Election of candidates for membership. 8 p.m.

Liverpool Architectural Society (Incorporated). — Mr. Percy Scott Worthington, M.A., on "The Houses of the Monks in the Middle Ages," illustrated by lantern slides. 6 p.m.

The Incorporated Clerks of Works Association.—Paper by Mr. J. Pain (President) on "Coal and its Formation." 7.30 p.m.

TUESDAY, JANUARY 9.

Institution of Civil Engineers.—Papers to be submitted for discussion:—(1) "The Elimination of Storm-Water from Sewerage Systems," by Mr. D. E. Lloyd-Davies. (2) "On the Elimination of Suspended Solids and Colloidal Matters from Sewage," by Lieut.-Colonel A. S. Jones, D.C., and Mr. W. O. Travis, M.D. 8 p.m.

WEDNESDAY, JANUARY 10.

Edinburgh Architectural Association (Associates' Meeting).—Mr. Ramsay Traquair on "Tombs," illustrated by lantern slides. 8 p.m.

The Association of Engineers-in-Charge (St. Bride's Institute).—Mr. Frank Crawter on "Storage Batteries and their Application to Public Institutions." 8 p.m.

THURSDAY, JANUARY 11.

Institution of Electrical Engineers.—Conclusion of discussion on Mr. W. H. Patchell's paper on "The Charing Cross Company's City of London Works." 8 p.m.

FRIDAY, JANUARY 12.

Institution of Civil Engineers (Students' Meeting).—Professor J. D. Cormack, B.Sc., on "The Theory of Machines." 8 p.m.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.		
Hard Stocks	1	7	0	per 1000 alongside, in river.	
Rough Stocks and Grizzles	1	4	0	,,	,, ,,
Facing Stocks	1	16	0	,,	,, ,,
Shippers	2	0	0	,,	,, ,,
Flettons	1	5	6	,,	at railway depôt.
Red Wire Cuts	1	11	0	,,	,, ,,
Best Fareham Red	3	12	0	,,	,, ,,
Best Red Pressed Ruabon Facing	5	0	0	,,	,, ,,
Best Blue Pressed Staffordshire	4	1	0	,,	,, ,,
Do. Bullnose	4	6	6	,,	,, ,,
Best Stourbridge Fire Bricks	3	15	6	,,	,, ,,
GLAZED BRICKS.					
Best White and Ivory Glazed Stretchers	12	0	0	,,	,, ,,
Headers	11	0	0	,,	,, ,,
Quoins, Bullnose, and Flats	16	0	0	,,	,, ,,
Double Stretchers	19	0	0	,,	,, ,,
Double Headers	16	0	0	,,	,, ,,
One Side and two Ends	19	0	0	,,	,, ,,
Two Sides and one End	20	0	0	,,	,, ,,
Splays, Chamferred, Squints	20	0	0	,,	,, ,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,, ,,
Quoins, Bullnose, and Flats	14	0	0	,,	,, ,,
Double Stretchers	15	0	0	,,	,, ,,
Double Headers	14	0	0	,,	,, ,,
One Side and two Ends	15	0	0	,,	,, ,,
Two Sides and one End	15	0	0	,,	,, ,,
Splays, Chamferred, Squints	14	0	0	,,	,, ,,
Second Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.

	s.	d.	
Thames and Pit Sand	6	9	per yard, delivered.
Thames Ballast	5	3	,, ,,
Best Portland Cement	26	0	per ton, ,,
Best Ground Blue Lias Lime	19	0	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8¼	,, ,,
PORTLAND STONE (20 ft. average)— Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½	,, ,,

	s.	d.	
Ancaster in blocks	1	10	per ft. cube, deld. rly. depôt.
Beer ,,	1	6	,, ,,
Greenshill ,,	1	10	,, ,,
Darley Dale in blocks	2	4	,, ,,
Red Corsehill ,,	2	2	,, ,,
Closeburn Red Freestone	2	0	,, ,,
Red Mansfield ,,	2	4	,, ,,
YORK STONE—*Robin Hood Quality.*			
Scappled random blocks	2	10	,, ,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super., ,,
6 in. rubbed two sides ditto, ditto	2	6	,, ,,
3 in. sawn two sides slabs (random sizes)	0	11½	,, ,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7¼	,, ,,
1½ in. to 2 in. ditto, ditto	0	6	,, ,,
HARD YORK—			
Scappled random blocks	3	0	per ft. cube, ,,
in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super., ,,
6 in. rubbed two sides ditto	3	0	,, ,,
3 in. sawn two sides slabs (random sizes)	1	2	,, ,,
2 in. self-faced random flags	0	5	,, ,,

	s.	d.	
Hopton Wood (Hard Bed) in blocks	2	0	per ft. cube, deld. rly. depôt.
,, ,, ,, 6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt.
,, ,, ,, 3 in. sawn both sides random slabs	1	0	,, ,,
,, ,, ,, 2 in. do.	0	8½	,, ,,

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 100 of 1200 at r. d.
20×12 ,, ,,	13	17	6	,, ,,
20×10 first quality ,,	13	0	0	,, ,,
20×12 ,, ,,	13	15	0	,, ,,
16×8 ,, ,,	7	5	0	,, ,,

PRICES CURRENT.—*Continued on page 30.*

List of Contracts, etc.

CONTRACTS.

(For some Contracts still open, but not included in this List, see previous issues.)

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Granite Kerb and Setts	Edmonton U.D.C.	G. Eedes Eachus, Engineer, Town Hall, Edmonton	Jan. 9
Additions to Abertysswg Council School	Monmouthshire Educ. Comm.	D. Morgan, Architect, Charles-street-chambers, Cardiff	do.
Additions to Rhymney Bridge Council School	do.	do.	do.
Conveniences (two), South Ward Recreation Ground	Crewe Town Council	Borough Surveyor, Crewe	do.
Road Works, Cleveland-road, North Shields	Tynemouth Corporation	J. F. Smillie, Borough Surveyor, Tynemouth	do.
Copper Lamps for Incandescent Gas Lighting	Leeds St. Lighting Committee	Superintendent of Street Lighting, Springwell-street, Leeds	do.
Reddish New Schools	Stockport Education Comm.	A. Lawton, Secretary to Committee, Stockport	do.
Firebricks, Blocks, Tiles, etc.	Rochdale Gas Committee	T. Banbury Ball, Manager, Gasworks, Rochdale	Jan. 10
Ventilation, etc., Bridgend Council School	Glamorgan C.C.	T. M. Franklen, Clerk, Westgate-street, Cardiff	do.
Fencing, etc., to Playground, Pontypridd School	do.	do.	do.
Kitchen and Alterations, Brithdir Council School	do.	do.	do.
Kitchen and Additions at Troedrhiwfuwch School	do.	do.	do.
Additions at Sandfields School, Aberavon	do.	do.	do.
School at Crynant, near Neath	do.	do.	do.
Fencing Site at Hengoed School	do.	do.	do.
Cloakrooms, etc., Berkswell Schools, near Coventry	Trustees	H. W. Chattaway, Architect, Trinity Churchyard, Coventry	do.
Stores	Gt. Indian Peninsula Railway	J. I. Berry, Secretary, 48, Copthall-avenue, London, E.C.	Jan. 11
Road Works, Adley-street	Hackney Borough Council	Norman Scorgie, Boro. Engineer, Town Hall, Hackney, N.E.	do.
Branch Stores, Manager's House, etc., Liversidge	Heckmondwike Co-opera. Soc.	H. Stead, Architect, Heckmondwike	do.
Extension, etc., of Whitewell Bottom School	Rawtenstall Corporation	A. Brocklehurst, Architect, St. James's-chambers, Waterfoot	do.
Painting Interior of Warehouse, Harter-street	Manchester Electricity Comm.	City Architect, Town Hall, Manchester	do.
Making-up Roads	Ruislip-Northwood U.D.C.	W. L. Carr, Surveyor, Council Offices, Northwood	Jan. 12
Ventilating Shafts, etc., Bitterne	South Stoneham R.D.C.	H. J. Weston, C.E., 24, Portland-street, Southampton	Jan. 13
Gasholder Tank in Concrete	Airdrie Town Council	A. Gillespie & Son, Engineers, 65, Bath-street, Glasgow	do.
Baths, Lecture Hall, House, etc., at Sutton Mill	Mr. J. Bairstow	S. Jackson & Son, Architects, Tanfield-chambers, Bradford	do.
Pipe-laying, Thornlie Bank-road, etc.	Glasgow Corporation	J. R. Sutherland, Engineer, 45, John-street, Glasgow	do.
Sewer (370 yds.), Stoneware Pipe	Newton-in-Makerfield U.D.C.	A. Bowes, Surveyor, Town Hall, Earlestown	do.
Additions, etc., to Temperance Hall, Birstall	Trustees	W. Hanstock & Son, Architects, Branch-road, Batley	do.
*ROADMAKING AND PAVING WORKS	Hendon U.D.C.	Council's Engineer, Council Offices, Hendon, N.W.	Jan. 15
Water Mains (3,050 yds.)	Cromer U.D.C.	J. C. Melliss, Engineer, 264, Gresham House, Old Broad-street	do.
Cemetery Works	Morecambe Town Council	J. Bond, Borough Surveyor, Town Hall, Morecambe	do.
Paving (Tar), Monega-road School Playgrounds	East Ham Education Comm.	R. L. Curtis, Architect, 11 and 12, Finsbury-square, E.C.	Jan. 16
60-ft. Spans	Secretary of State for India	Director General of Stores, India Office, Whitehall	do.
Rebuilding Pair of Horizontal Engines at Workhouse	Lambeth Guardians	G. E. Arnold, C.E., 26, Victoria-street, Westminster, S.W.	do.
Fireclay Pipes, Grit Setts, Road Material, etc.	Lancaster Corporation	J. C. Mount, Borough Surveyor, Lancaster	do.
*OFFICES AT WORKHOUSE	Hendon Guardians	Union Offices, Edgware	Jan. 17
Police and Ambulance Station, Moss-lane East	Manchester Corporation	City Architect, Town Hall, Manchester	do.
School, Rose Green, St. George	Bristol Education Committee	H. J. Jones & Son, Architects, 12, Bridge-street, Bristol	Jan. 18
Hurdles, 160 lineal yds. of Wrought-Iron	Warrington Corporation	Borough Surveyor, Warrington	do.
Plant (Dynamos and Crane)	Leyton U.D.C.	F. Lewis, Elect. Light & Pwr. Wks., Cathall-rd., Leytonstone	do.
Granite	West Ham Guardians	F. E. Hilleary, Clerk, Manor Workhouse, Leytonstone, E.	do.
Materials, etc.	Lambeth Borough Council	H. Edwards, Borough Engineer, 346, Kennington-road, S.E.	do.
Private Street Works	Croydon R.D.C.	R. M. Chart, F.S.I., Town Hall, Croydon	do.
Granite and Slag	Spilsby R.D.C.	T. A. Bushridge, C.E., District Surveyor of Highways, Spilsby	do.
*HEATING OF SCHOOL, ROSE GREEN	Bristol Education Committee	H. J. Jones & Son, Architects, 12, Bridge-street, Bristol	do.
*SERVICES AND SUPPLY OF MATERIAL	Lambeth Borough Council	Borough Engineer, 346, Kennington-road, S.E.	do.
Workhouse Infirmary Alterations, etc., Chepstow	Chepstow Guardians	Holliday & Rodger, Architects, 14, High-street, Cardiff	Jan. 19
Houses (two), Mill-road, Ely	Mr. Miller	W. H. Dashwood Caple, Arch., Church-st.-chambers, Cardiff	Jan. 20
Underground Convenience	Wigan Corporation	Borough Engineer's Office, King-street West, Wigan	do.
Stores	Birmingham Works Comm.	City Surveyor's Office, Council House, Birmingham	do.
Materials	do.	do.	do.
*DEFECTIVE SCHOOL, ETC.	Beckenham U.D.C.	Council's Surveyor, Beckenham	Jan. 22
Alterations, etc., to P.M. Church, Bedlington Station	.....	S. James, Ivy House, Bedlington Station	Jan 23
Stores	Plymouth Corporation	E. G. Okell, Boro' Elect. Engineer, Prince Rock, Plymouth	Jan. 24
*ANNUAL CONTRACTS	County Borough of West Ham	Borough Engineer, Town Hall, Stratford, E.	Jan. 26
Intercepting Sewers, Tanks, Bacteria Beds, etc.	Huddersfield Corporation	K. F. Campbell, Engineer, Town Hall, Huddersfield	Jan. 27
Gas Plants, Engines, Sludge Pumps, etc.	do.	do.	do.
Sewage Screen and Elevator	do.	do.	do.
Sewage Discharge Recorder	do.	do.	do.
Sewage Distributors and Cables	do.	do.	do.
Broken Granite	Norfolk C.C.	T. H. B. Heslop, County Surveyor, Norwich	do.
Furniture and Equipment of Isolation Hospital	Newhaven U.D.C.	E. Knightley, Clerk, Newhaven	Jan. 29
*INFANTS' SCHOOL, PORTSLADE-BY-SEA	F. Sussex Local Educ. Auth.	County Surveyor, County Hall, Lewes	Feb. 2
*SCHOOL, ETC., CHIDDINGLY	do.	do.	do.
*ADDITIONS, ETC., TO SCHOOL, PLUMPTON	do.	do.	do.
Pleasure Ground, The Marsh	Wadebridge U.D.C.	W. O. Wellington, Clerk, Wadebridge	Feb. 3
Painting (12 Contracts)	Lancashire & Yorkshire Ry.	Engineer's Office, Hunt's Bank, Manchester	Feb. 5
*ISOLATION HOSPITAL	Cheshunt U.D.C.	Clerk to the Council, Manor House, Cheshunt	Feb. 12
*EXTENSION OF SHIRE HALL, BEDFORD	Bedfordshire C.C.	County Architect, Shire Hall, Bedford	Feb. 17
Stable at Wylam	.....	W. Bedlington, Architect, 23, Eldon-sq., Newcastle-on-Tyne	No date.
Alterations, etc., to Metropole Theatre, Birkenhead	.....	W. Hesketh & Co., Architects, 62, Dale-street, Liverpool	do.
Driving of Heading or Drift, 125 yds. Long	.....	Grane Quarry Co., Haslingden	do.
Rebuilding the Shakespeare Inn, Neath	Mr. E. Evans Bevan	J. Cook Rees, Architect, Neath	do.
House at Creigian	.....	J. H. Evans, 16, Market-square, Pontypridd	do.
*SECONDARY SCHOOL	Aylesbury Grammar School	F. Taylor, Architect, 26, Temple-street, Aylesbury	do.
*NEW SCHOOLS, NORTH REDDISH	Stockport Educa. Committee	Secretary, Education Committee, Stockport	do.

AUCTION SALES.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sim	Jan. 10
*BATH FITTINGS, ETC.—9 and 11, High-street, Kingsland	Horne & Co.	Jan. 11
*FREEHOLD PROPERTY, LEWISHAM—At the Mart	Debenham, Tewson, & Co.	Jan. 23

* *Those with an asterisk are advertised in this number*: *Competitions*, —; *Contracts*, iv. vi. viii. x.; *Public Appointments*, xxix.; *Auction Sales*, l.

PRICES CURRENT.—*Continued from page 29.*

SLATES (*continued*).

In. In.	£ s. d.	
20×10 best blue Portmadoc	12 12 6	per 1000 of 1200 at r. d.
16×8 „ „	6 12 6	„ „
20×10 best Eureka unfading green	15 17 6	„ „
20×12 „ „	18 7 6	„ „
18×10 „ „	13 5 0	„ „
16×8 „ „	10 5 0	„ „
20×10 permanent green	11 12 6	„ „
18×10 „ „	9 12 6	„ „
16×8 „ „	6 12 6	„ „

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. „
Best Broseley tiles	50	0	per 1000 „
Do. Ornamental tiles	52	6	„ „
Hip and Valley tiles	4	0	per doz. „
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 „
Do. Ornamental do.	60	0	„ „
Hip tiles	4	0	per doz. „
Valley tiles	3	0	„ „
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 „
Do. Ornamental do.	54	6	per 1000 at rly. depôt.
Hip tiles	4	1	per doz. „
Valley tiles	3	8	„ „
Best "Rosemary" brand plain tiles	48	0	per 1000 „
Best Ornamental tiles	50	0	„ „
Hip tiles	4	0	per doz. „
Valley tiles	3	8	„ „
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 „
Do. pressed	47	6	„ „
Do. Ornamental do.	50	0	„ „
Hip tiles	4	0	per doz. „
Valley tiles	3	6	„ „

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	... 15 0 0
Deals: best 3 by 9	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6...	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best.
Battens: seconds	0 10 0	,, ,,
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	... 10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	... 9 10 0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	,,
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	... 5 0 0
Seconds	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.)	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.)	3 0 0	... 3 10 0
Swedish balks	2 10 0	... 3 0 0
Pitch-pine timber (30 ft. average)	3 5 0	... 3 15 0

JOINERS' WOOD.	At per standard. £ s. d.	£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	... 25 0 0
3 in. by 9 in.	22 0 0	... 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	... 18 0 0
Second yellow deals, 3 in. by 11 in.	18 10 0	... 20 0 0
,, ,, 3 in. by 9 in.	17 10 0	... 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	... 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	... 12 0 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	... 22 10 0
Do. 3 in. by 9 in.	18 0 0	... 19 10 0
Battens	13 10 0	... 15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	... 17 0 0
Do. 3 in. by 9 in.	14 10 0	... 16 0 0
Battens	11 0 0	... 12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	... 14 0 0
Do. 3 in. by 9 in.	12 10 0	... 14 0 0
Battens	10 0 0	... 11 0 0
White Sea and Petersburg— First white deals, 3 in. by 11 in.	14 10 0	... 15 10 0
,, ,, 3 in. by 9 in.	13 10 0	... 14 10 0
Battens	11 0 0	... 12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	... 14 10 0
,, ,, 3 in. by 9 in.	12 10 0	... 13 10 0
,, ,, battens	10 0 0	... 11 0 0
Pitch-pine: deals	16 10 0	... 20 0 0
Under 2 in. thick extra	0 10 0	... 1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	,,
Seconds, regular sizes	33 0 0	,,
Yellow Pine oddments	28 0 0	,,
Kauri Pine—Planks, per ft. cube	0 3 6	... 0 5 0
Danzig and Stettin Oak Logs— Large, per ft. cube	0 3 0	... 0 3 6
Small ,, ,,	0 2 6	... 0 2 9
Wainscot Oak Logs, per ft. cube	0 5 0	... 0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	... 0 0 9
¾ in. do. do	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	... 0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	... 0 1 0
Teak, per load	17 0 0	... 22 0 0
American Whitewood Planks, per ft. cube	0 4 0	... 0 5 0
Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	... 0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	... 0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	... 1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	... 0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	... 0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	... 0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	... 0 13 6
1 in. by 7 in. ,, ,,	0 14 0	... 0 18 0
¾ in. by 7 in. white ,, ,,	0 10 0	... 0 11 6
1 in. by 7 in. ,, ,, ,,	0 12 9	... 0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	... 7 0 0
Compound Girders, ordinary sections	7 15 0	... 8 15 0
Steel Compound Stanchions	9 7 6	... 10 17 6
Angles, Tees, and Channels, ordinary sections	7 15 0	... 8 15 0
Flitch Plates	8 0 0	... 8 10 0
Cast Iron Columns and Stanchions including ordinary patterns	6 17 6	... 8 0 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON— Common Bars	8 0 0	... 8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	... 9 0 0
Staffordshire "Marked Bars"	10 0 0	... —
Mild Steel Bars	8 15 0	... 9 0 0
Hoop Iron, basis price	9 5 0	... 9 10 0
,, ,, Galvanised	17 0 0	... —
(*And upwards, according to size and gauge.)		
Sheet Iron Black— Ordinary sizes to 20 g.	9 10 0	... —
,, ,, 24 g.	10 10 0	... —
,, ,, 26 g.	12 0 0	... —
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 0 0	... —
Ordinary sizes to 22 g. and 24 g.	14 10 0	... —
,, ,, 26 g.	15 0 0	... —

METALS (*continued*).

	Per ton, in London. £ s. d.	£ s. d.
IRON—*continued*. Sheet Iron, Galvanised, flat, best quality— Ordinary sizes to 20 g.	17 0 0	... —
,, ,, 22 g. and 24 g.	17 10 0	... —
,, ,, 26 g.	19 0 0	... —
Galvanised Corrugated Sheets— Ordinary sizes 6 ft. to 8 ft. 20 g.	13 10 0	... —
,, ,, 22 g. and 24 g.	14 0 0	... —
,, ,, 26 g.	15 5 0	... —
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 10 0	... —
Best Soft Steel Sheets, 22 g. & 24 g.	12 10 0	... —
,, ,, ,, 26 g.	14 15 0	... —
Cut Nails, 3 in. to 6 in.	9 10 0	... 9 15 0

(Under 3 in., usual trade extras.)

LEAD, &c.	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up.	20 0 0	... —
Pipe in coils	20 10 0	... —
Soil pipe	23 0 0	... —
Compo pipe	23 0 0	... —
ZINC—Sheet— Vieille Montagne ...ton	33 0 0	... —
Silesian	32 15 0	... —
COPPER— Strong Sheet ...per lb.	0 1 0	... —
Thin ,, ... ,,	0 1 1	... —
Copper nails ... ,,	0 0 11	... —
BRASS— Strong Sheet ... ,,	0 0 11	... —
Thin ,, ... ,,	0 1 0	... —
TIN—English Ingots ... ,,	0 1 8	... —
SOLDER—Plumbers' ... ,,	0 0 8	... —
Tinmen's ... ,,	0 0 10	... —
Blowpipe ... ,,	0 0 11	... —

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2⅜d. per ft. delivered.
,, fourths	1⅞d. ,, ,,
21 oz. thirds	3⅜d. ,, ,,
,, fourths	2⅝d. ,, ,,
26 oz. thirds	4⅛d. ,, ,,
,, fourths	3⅛d. ,, ,,
32 oz. thirds	5⅛d. ,, ,,
,, fourths	5d. ,, ,,
Fluted Sheet, 15 oz.	3⅛d. ,, ,,
,, 21 oz.	4⅛d. ,, ,,
⅛ Hartley's Rolled Plate	2d. ,, ,,
⅜ ,, ,, ,,	2⅛d. ,, ,,
½ ,, ,, ,,	2⅛d. ,, ,,
Figured and Oxford Rolled Oceanic, etc. ... white	4d. ,, ,,
,, ,, ,, tinted	5¼d. ,, ,,

OILS, &c.	£ s. d.
Raw Linseed Oil in pipes ... per gallon	0 1 11
,, ,, ,, in barrels ... ,,	0 2 0
,, ,, ,, in drums ... ,,	0 2 2
Boiled ,, ,, in pipes ... ,,	0 2 1
,, ,, ,, in barrels ... ,,	0 2 2
,, ,, ,, in drums ... ,,	0 2 4
Turpentine in barrels ... ,,	0 4 2
,, in drums ... ,,	0 4 4
Genuine Ground English White Lead per ton	22 10 0
Red Lead, Dry ... ,,	21 10 0
Best Linseed Oil Putty ... per cwt.	0 6 6
Stockholm Tar ... per barrel	1 12 0

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l*., unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

ACTON.—For new Court-house, Acton, for Middlesex County Council:—

R. Wilkins & Sons	£7,379	C. Wall, Ltd.	£6,400
W. Gibson & Co.	7,284	Galbraith Bros.	6,390
Leslie & Co., Ltd.	7,013	T. H. Kingerlee & Sons	6,387
Johnson & Co.	6,849	W. Lawrence & Son	6,384
Spiers & Son	6,784	A. N. Coles	6,372
W. Johnson & Co., Ltd.	6,764	J. Dorey & Co.	6,360
Treasure & Son	6,754	A. & B. Hanson	6,340
H. Lovatt, Ltd.	6,690	F. Gough & Co.	6,284
W. F. Vigor & Co.	6,689	Edwards & Medway	6,220
Waring & Gillow, Ltd.	6,680	W. J. Dickens	6,200
F. G. Minter	6,677	F. & G. Foster	6,144
Speechley & Smith	6,675	J. Barker & Co., Ltd.	6,083
H. Knight & Son	6,595	A. Hudson & Co.	6,060
Wisdom Bros.	6,575	J. Garrett & Son	6,044
H. Willcock & Co.	6,575	B. E. Nightingale	5,998
Patman & Fotheringham	6,523	G. H. Gibson	5,947
J. C. Mather	6,500	W. H. Hyde, Clifford-road, Norwood Junction*	5,788
M. E. Fitt	6,463		

[The estimate of the County Engineer was £6,500.]

BOVEY TRACEY.—For sewerage and sewage disposal works, for Newton Abbot Rural District Council. Messrs. Beesley, Son, & Nichols, engineers, 11, Victoria-street, Westminster:—

S. W. Harrison & Co.	£8,950 0 0	B. Firth	£6,093 7 6½
Hawking & Best	7,613 9 0	A. N. Coles	6,090 0 0
J. C. Lang	7,461 3 0	J. Jackson	6,088 4 9
Underwood & Bro.	7,389 0 0	F. Osenton	5,982 0 0
R. B. Neal, Ltd.	7,119 0 0	W. E. Shaddock	5,898 0 0
G. Pollard & Co., Ltd.	6,800 0 0	R. E. Narracott	5,854 0 0
J. Dickson	6,798 0 0	G. G. Raynor	5,737 0 0
A. G. Osenton	6,605 9 0	F. J. Stanbury	5,698 2 1
D. Cameron	6,536 0 0	J. W. Dean, Ltd.	5,633 6 9
T. Shaddock	6,489 12 10	E. Tabor	5,584 12 0
W. Hill & Co.	6,452 0 0	E. Pike	5,531 12 4
J. Shaddock	6,446 12 6	Smith & Co.	5,366 0 0
Pethick Bros.	6,444 0 0	E. Harris	5,024 0 0
Muirhead, Greig, & Matthews	6,390 16 11	Steer & Pearce, Plymouth*	4,818 13 0
F. A. A. Stacey	6,350 0 0	J. H. Macdonald‡	4,620 0 0
A. J. Cottle	6,321 0 0		

‡Withdrawn.

BRIDLINGTON.—For erecting a Congregational church and schoolroom in St. John-street, for the Trustees of Zion Chapel. Mr. J. Shepherdson, architect, 15, Manor-street, Bridlington:—

A. A. Booth	£1,450 0 0	Smallwood & Shaw	£1,273 13 1
J. H. Fenwick	1,410 0 0	E. Wilson	1,245 8 0
A. Gardham	1,380 8 2	J. R. Stork	1,238 1 6
T. Gray	1,355 12 4	E. E. Yeomans	1,200 0 0
Carr & Creaser	1,337 17 0	R. Musk	1,194 9 3
W. H. Fell	1,299 15 0	J. Sawden, Bridlington*	1,166 0 0
F. Kneeshaw	1,277 2 0		

BURGH-NEXT-AYLSHAM.—For proposed new school, for the Norfolk Education Committee. Mr. A. F. Scott, architect, Castle Meadow, Norwich:—

R. Chapman	£1,560 0 0	W. Mace	£1,388 0 0
Baker Ltd.	1,511 2 10	G. Lines	1,388 0 0
Atherton	1,488 0 0	W. Hannant	1,387 0 0
J. S. Smith	1,469 0 0	A. D. Boddy & Son	1,377 0 0
W. & F. Appleton	1,431 0 0	J. Youngs & Son	1,358 0 0
Spence, Santo, & Co.	1,430 0 0	W. Neale	1,350 0 0
Batchelor	1,428 12 0	W. Porter	1,340 0 0
J. Evans	1,399 0 0	T. H. Blyth	1,270 0 0
Downing Bros.	1,397 0 0	R. C. Watts, Buxton*	1,250 0 0
Scarles Bros.	1,395 0 0	Kemp	1,123 17 8

CLEETHORPES.—For new roads, paving, kerbing, channelling, and sewers on the Tennyson Estate, Grimsby-road, Cleethorpes. Mr. H. C. Scaping, architect, Court-chambers, Grimsby:—

H. J. Mason, Cleethorpes* £1,976 11 8

DOVER.—For constructing Kearsney-avenue (West), for the Town Council. Mr. H. E. Stilgoe, Borough Engineer, Maison Dieu House, Dover:—

G. Browning	£453 0 0	G. Lewis & Sons	£389 10 0
W. H. Grigg	442 0 0	G. Keeler, Dover*	366 16 4
W. Strong	419 19 9		

GUILDFORD.—For constructing a 40-ft. road from Harvey-road to Pewley-hill, for the trustees of Poyle Charity Estate. Mr. W. G. Lower, Surveyor to Trustees, 12A, High-street, Guildford:—

Cunningham & Co.	£1,624 6 7½
Hewitt & Sons	1,555 19 6
Edwards & Co.	1,438 3 7
A. Streeter & Co.	987 15 6
S. Kavanagh & Co.	985 10 0
G. A. Franks, Guildford*	942 0 0

LICHFIELD.—For erecting six villas at Cherry Orchard, for Messrs. Taylor. Mr. G. W. Barrett, architect and surveyor, Chesterfield-road, Lichfield :—

Smith	£2,400 0	Twist	£1,955 10
W. Wistance	2,279 0	J. Maddocks, Burton-on-Trent*	1,940 0
Lowe	2,095 0		
Barton	2,020 0		
Deakin	2,019 0	T. Walmesley	1,920 0

[Messrs. Taylor provide all grates, baths, tanks, and water-closets.]

LONDON.—For repairs and decorations at "The Mitford Tavern," Hackney, N.E. Mr. H. Riches, architect, 3, Crooked-lane, King William-street, London, E.C. :—

W. Irwin	£704	T. S. Elkington & Sons	£381
J. T. Robey	502	A. W. Derby*	368
T. Osborn & Sons	410		

LONDON.—For decorations to shop premises, Chatsworth-road, Homerton, N.E. Mr. H. Riches, architect, 3, Crooked-lane, King William-street, London, E.C. :—

A. W. Derby	£146 0	T. S. Elkington & Sons	£128 0
F. Parsons & Sons	128 10	T. Osborn & Sons*	108 0

LONDON.—For repairs and decorations at "The Galloway Arms," Limehouse, E. Mr. H. Riches, architect, 3, Crooked-lane, King William-street, London, E.C. :—

J. T. Robey	£490	T. S. Elkington & Sons*	£255
G. Barker	349		
C. W. Stagg	278		

LONDON.—For fitting-up of two shops, Putney, S.W. Mr. H. Riches, architect, 3, Crooked-lane, King William-street, London, E.C. :—

Courtney & Fairbairn* £247 10 0

MACCLESFIELD.—For additions to Nurses' Home at the Fever Isolation Hospitals, Moss-lane, for the Health Committee, Macclesfield Corporation. Mr. C. W. Stubbs, Borough Surveyor :—

G. Simpson & Son, Windmilll-street, Macclesfield £112

MILLPORT.—For widening and extension of pier, for the Town Council. Mr. J. Cowan, C.E., 179, West George-street, Glasgow :—

G. Halliday, Ltd., Rothesay* £6,435 4

NORTHFIELD.—For the erection of a public library at Northfield, for the King's Norton and Northfield Urban District Council. Messrs. Bateman & Bateman & A. Hale, architects, 81A, Edmund-street, Birmingham. Quantities by Mr. C. Silk, 33, Newhall-street, Birmingham :—

R. M. Hughes	£1,390	T. A. Cole & Son	£1,170
G. Huins & Sons	1,326	C. Griffiths	1,138
G. Foster, jun.	1,311	G. E. Jackson	1,104
T. Johnson	1,294	W. Jackson	1,091
T. Lond & Sons	1,290	C. Pegram	1,088
J. Dallow & Sons	1,245	H. J. Pills	1,079
Giles & Sons	1,239	G. E. Cragg, Selly Oak*	1,035
Gowing & Ingram	1,185		

READING.—For Reading sorting-office enlargement :—

W. Jones	£2,595	....	£80
F. J. Stanbury	2,391	....	24
W. Hawkins	2,476	....	120
A. Faulks	2,381	....	85
W. T. Toogood & Co.	2,250	....	89
R. Curtis	2,165	....	16
H. W. Godwin	2,137	....	73
W. H. Hyde	1,986	....	—
Batten Bros.	2,030	....	50
G. H. Tucker	2,165	....	243
G. Pilgrim	1,979	....	85
G. E. Hughes	1,910	....	75
A. J. Colborne	1,891	....	88
Martin Wells & Co.	1,967	....	167
McC. E. Fitt*	1,774	....	124

SHEFFIELD.—For alterations to Sheffield County Court :—

			Allowance for Old Materials.
Dawson, Jones, & Co.	£2,770 0	....	£10 0
Dennis, Gill, & Son	2,638 0	....	10 0
H. Boot & Son	2,430 0	....	20 0
J. Eshelby & Son	2,405 0	....	10 0
G. Longden & Sons, Ltd.	2,430 0	....	30 0
E. & W. Oxley	2,350 0	....	—
J. Fidler, Ltd	2,353 10	....	29 0
J. & H. Wheen	2,197 0	....	—
Ash, Son, & Biggin, Ltd., Furnival-st., Sheffield	2,200 0	....	13 5

SHEFFIELD.—For alteration to the "Barrel Inn," Broad-lane, Sheffield, for Messrs. T. Rawson & Co., Ltd. Messrs. Hall & Fenton, architects, 14, St. James's-row, Sheffield. Quantities by architects :—

Martin & Hughes	£769 0 0	F. Drake	£675 0 0
H. Boot & Son	734 0 0	G. H. May & Sons	673 12 0
W. Freeman	725 0 0	W. W. Mears	662 10 0
E. & W. Oxley	689 0 0	A. Bradbury	662 0 0
W. C. Mander	689 0 0	M. Hancock	647 10 0
H. White	687 7 7	T. Margerrison, Church-street, Deconsfield*	645 12 6
G. Allen	680 0 0		

SHEFFIELD.—For alterations to premises at corner of London-road and Cemetery-road, Sheffield, for the Directors of the Birmingham District and Counties Banking Co., Ltd. Messrs. Hall & Fenton, architects, 14, St. James's-row, Sheffield. Quantities by architects :—

J. Estelby & Son	£765 0 0	J. Fidler, Ltd.	£658 0 0
G. Allen	735 0 0	T. Margerrison	643 0 0
G. Malpass	682 0 0	B. Powell & Son	642 0 0
W. W. Mears	673 16 9	E. & W. Oxley	639 0 0
J. Martin & Son	669 0 0	H. Boot & Sons, Moore-street, Sheffield‡	620 0 0
D. O'Niel & Son	661 0 0		

‡ Accepted subject to various deductions.

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VICTORIA LACE FACTORY, DRAYCOTT.—In our issue for December 23 we printed a list of tenders for this work, but the lowest but one tender was omitted, *i.e.*, T. W. Youngman, Station-road, Draycott, £4,140. The mistake was not ours; we printed the list as it was sent to us.

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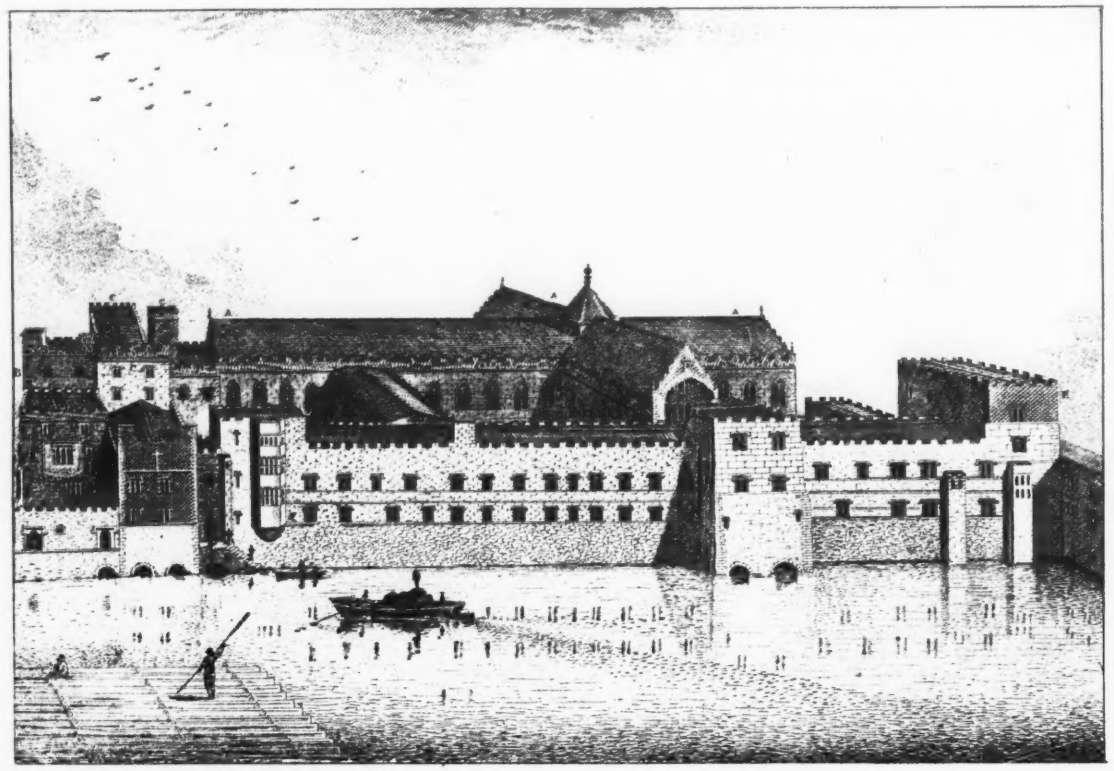
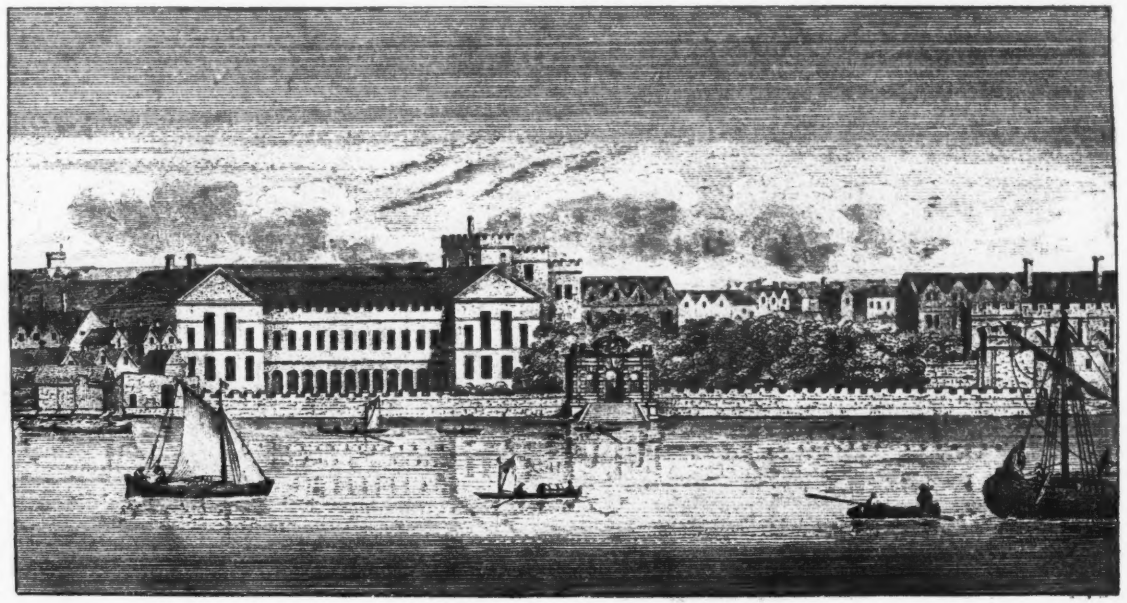
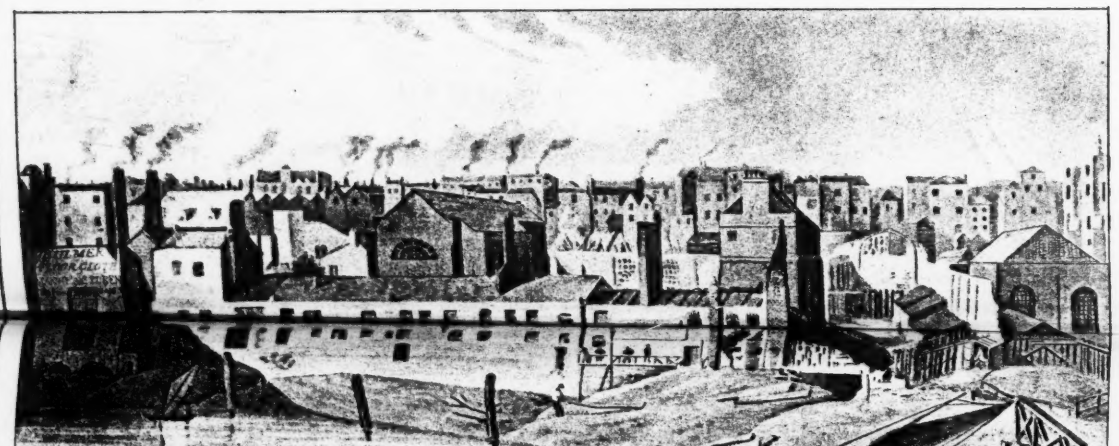
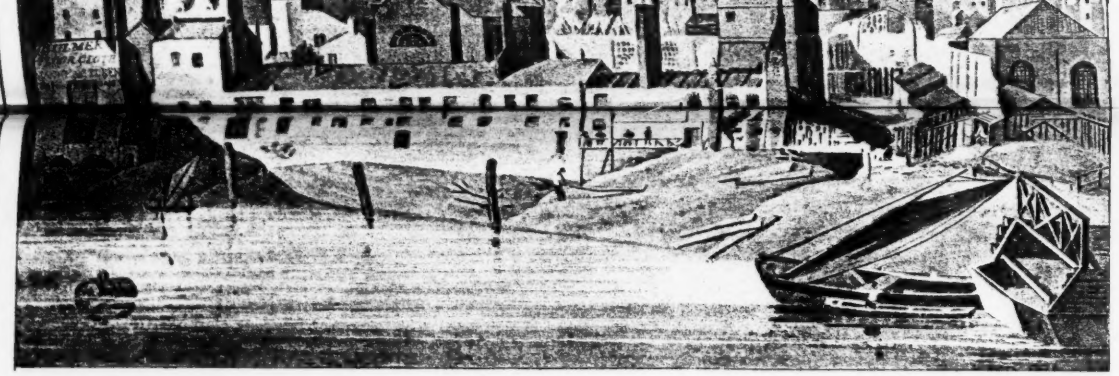


The Savoy, from the Thames. (From Vertue's drawing, 1736.)

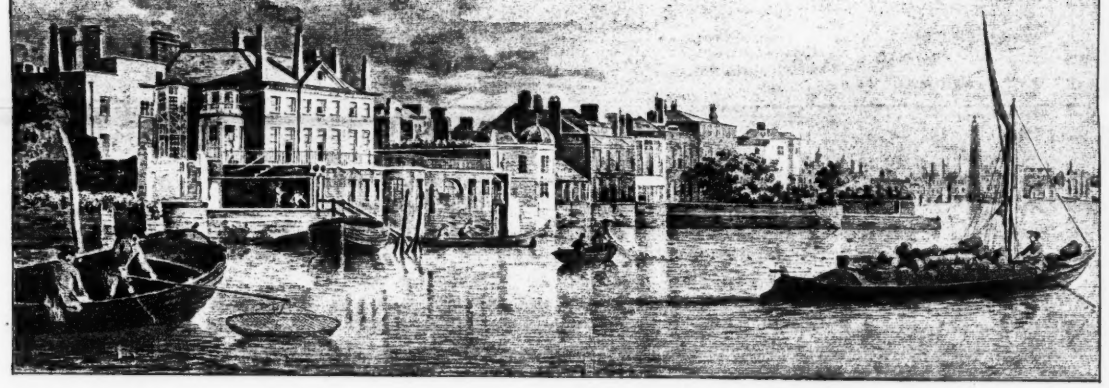


York House and the Water Gate (*circa* 1630).



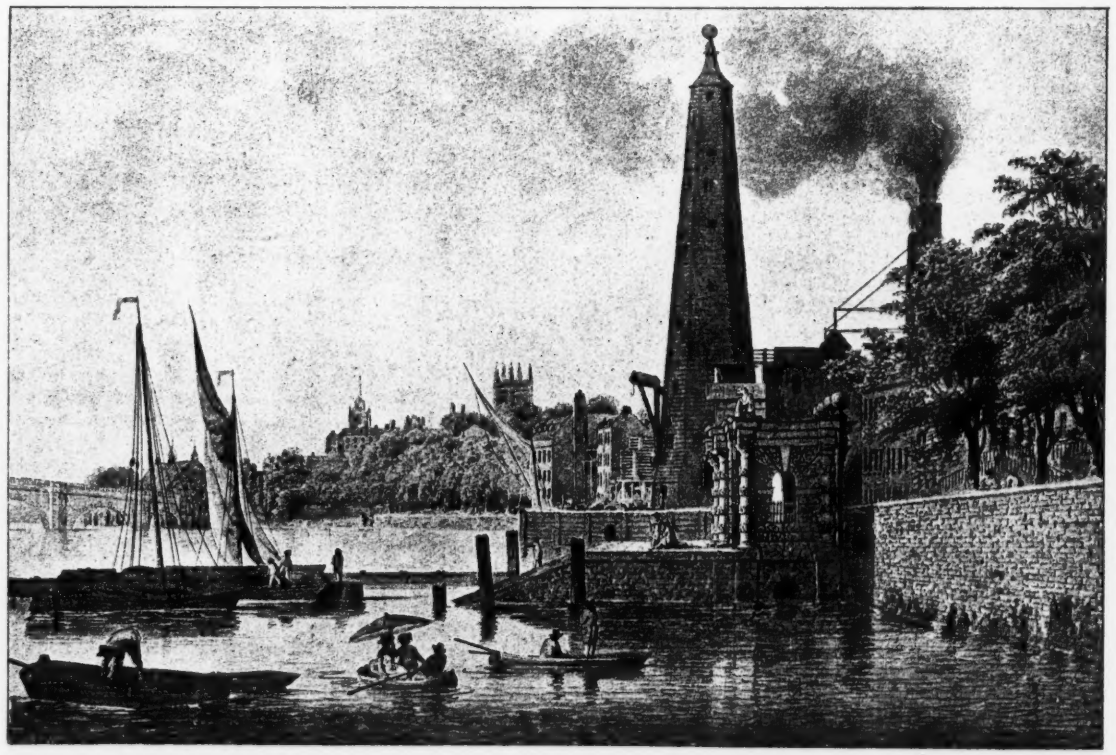


Part of the Ruins of the Savoy in 1816.



Derby House, Westminster (*circa* 1750).

Savoy Chapel and Palace (in 1810).



York Gate and the Water Tower (1797).

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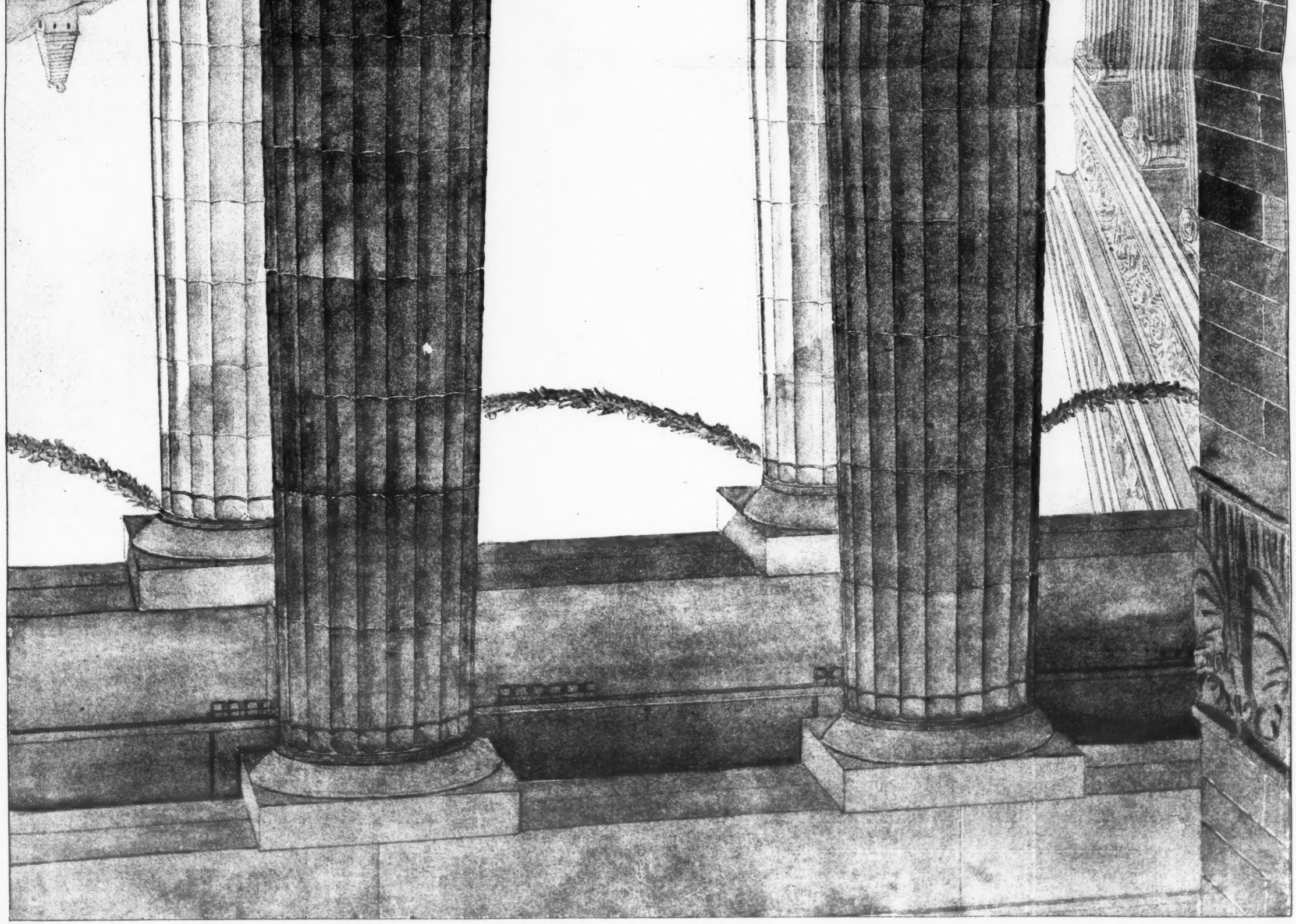
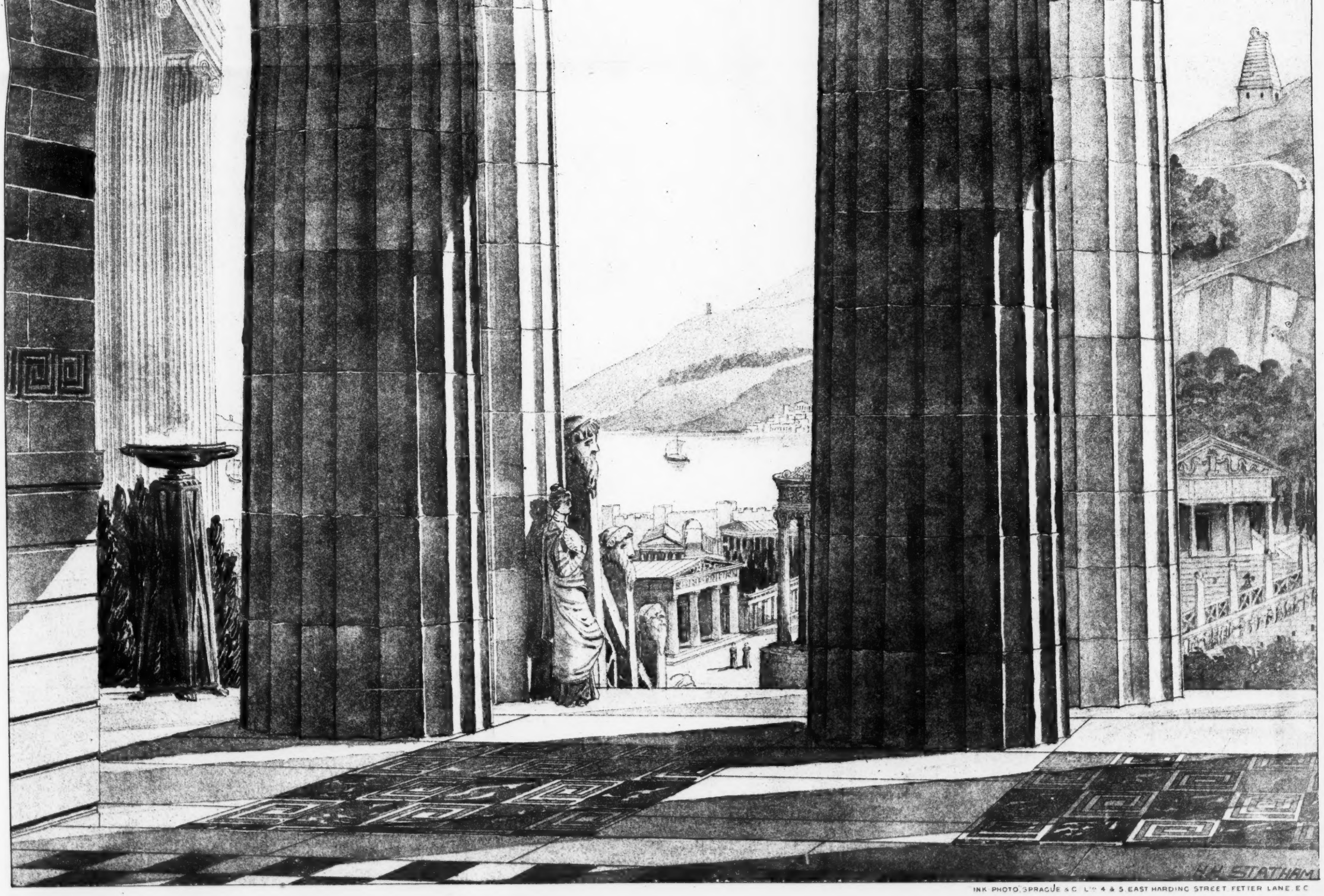
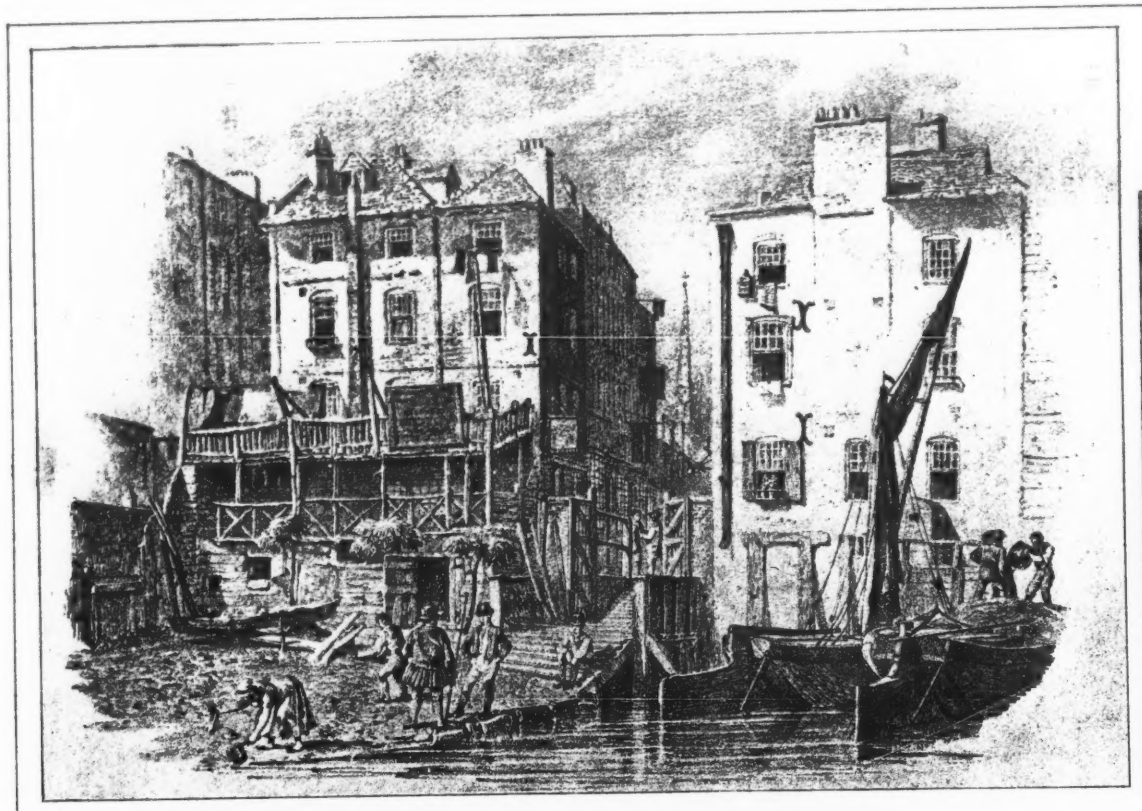
VIEWS OF OLD LONDON IN THE NEIGHBOURHOOD OF THE SAVOY AND CHARING CROSS.—PLATE I.



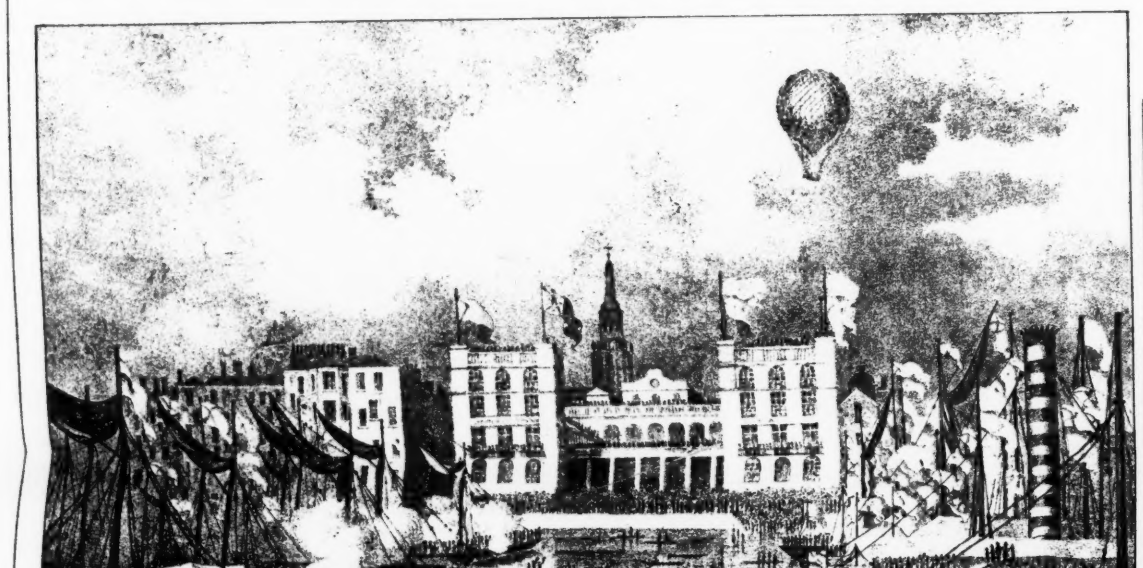


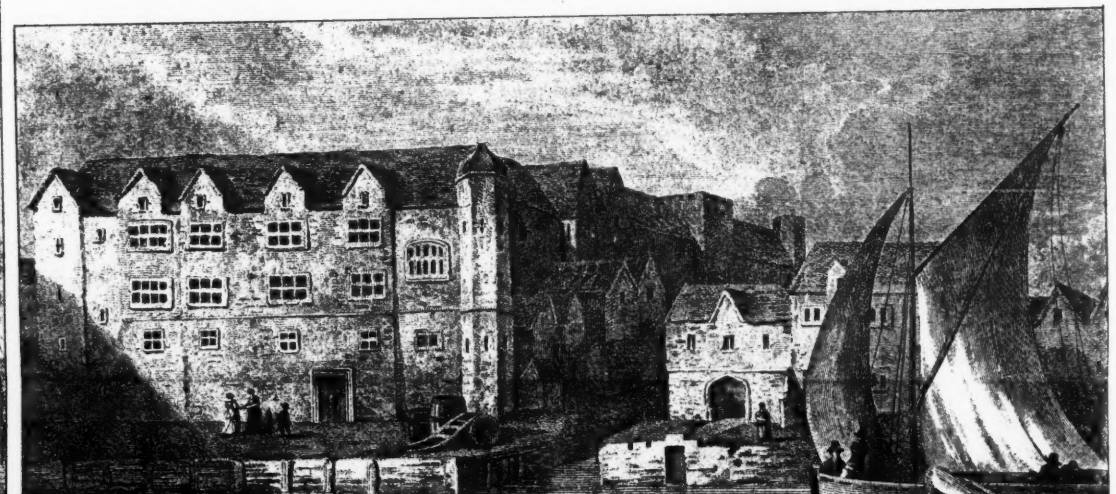
UNDER THE TEMPLE PORTICO.—By the Editor.

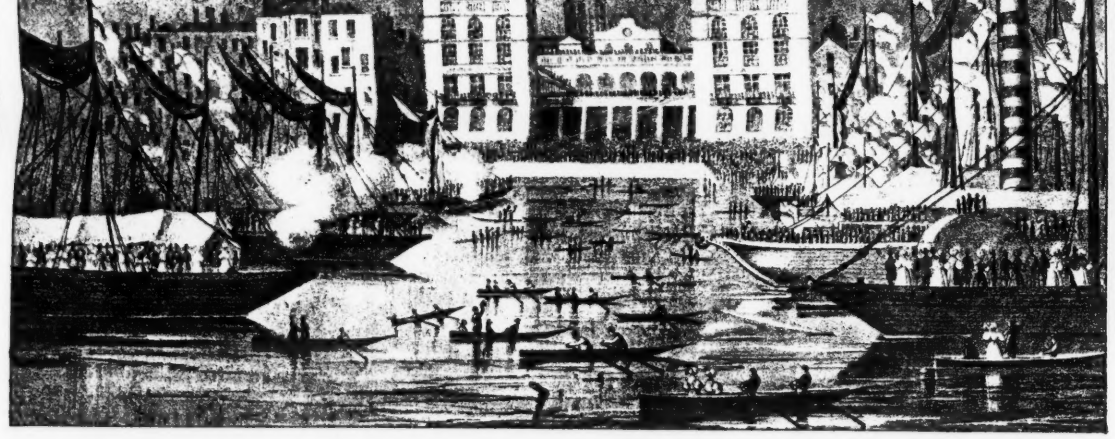


Hungerford Stairs, Westminster.

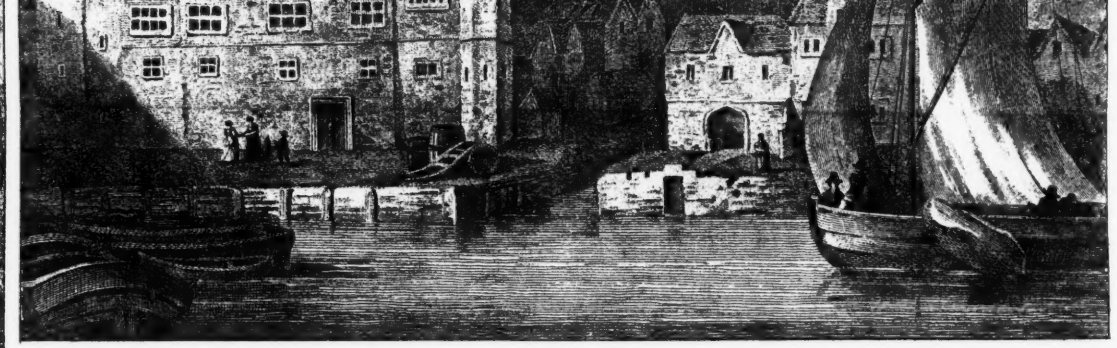
Durham House (*circa* 1630). Salisbury House. Worcester House.



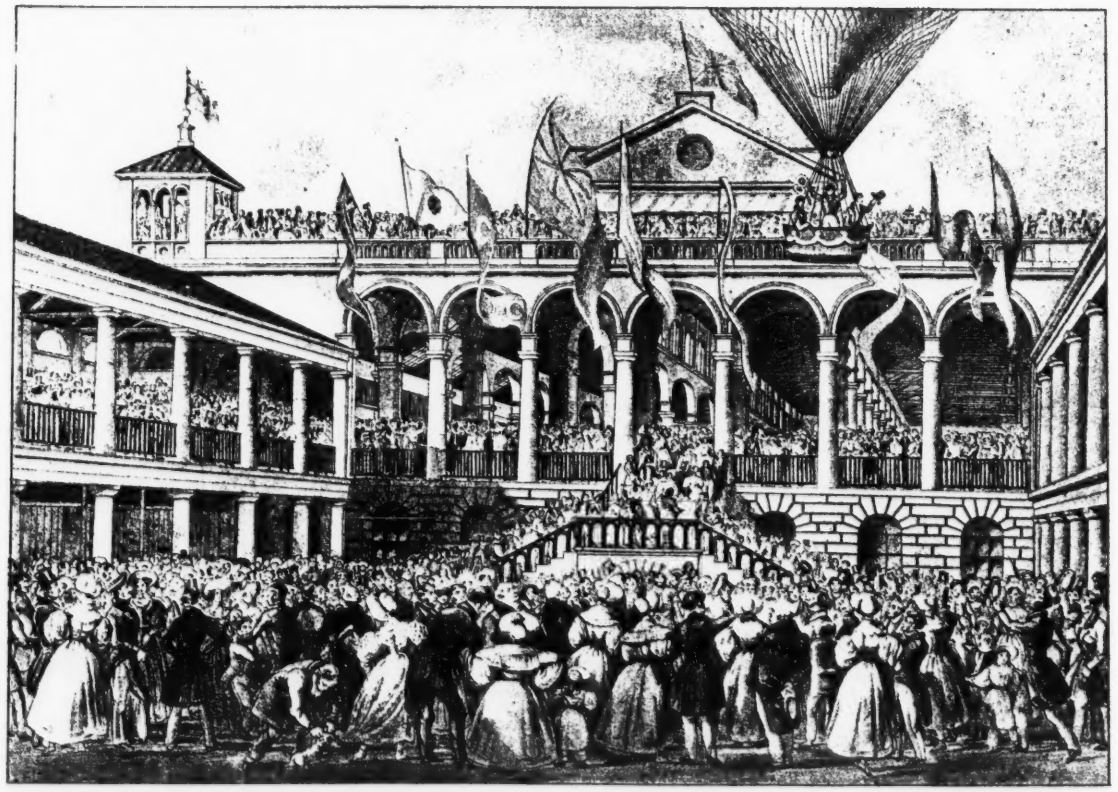




New Hungerford Market: River Front: 1833.



Bridewell Palace, with the entrance to Fleet River: *circa* 1660.



New Hungerford Market, on the day of opening, July 2, 1833.

Portrait bust of E. Hungerford, placed on north side of Old Market-house.

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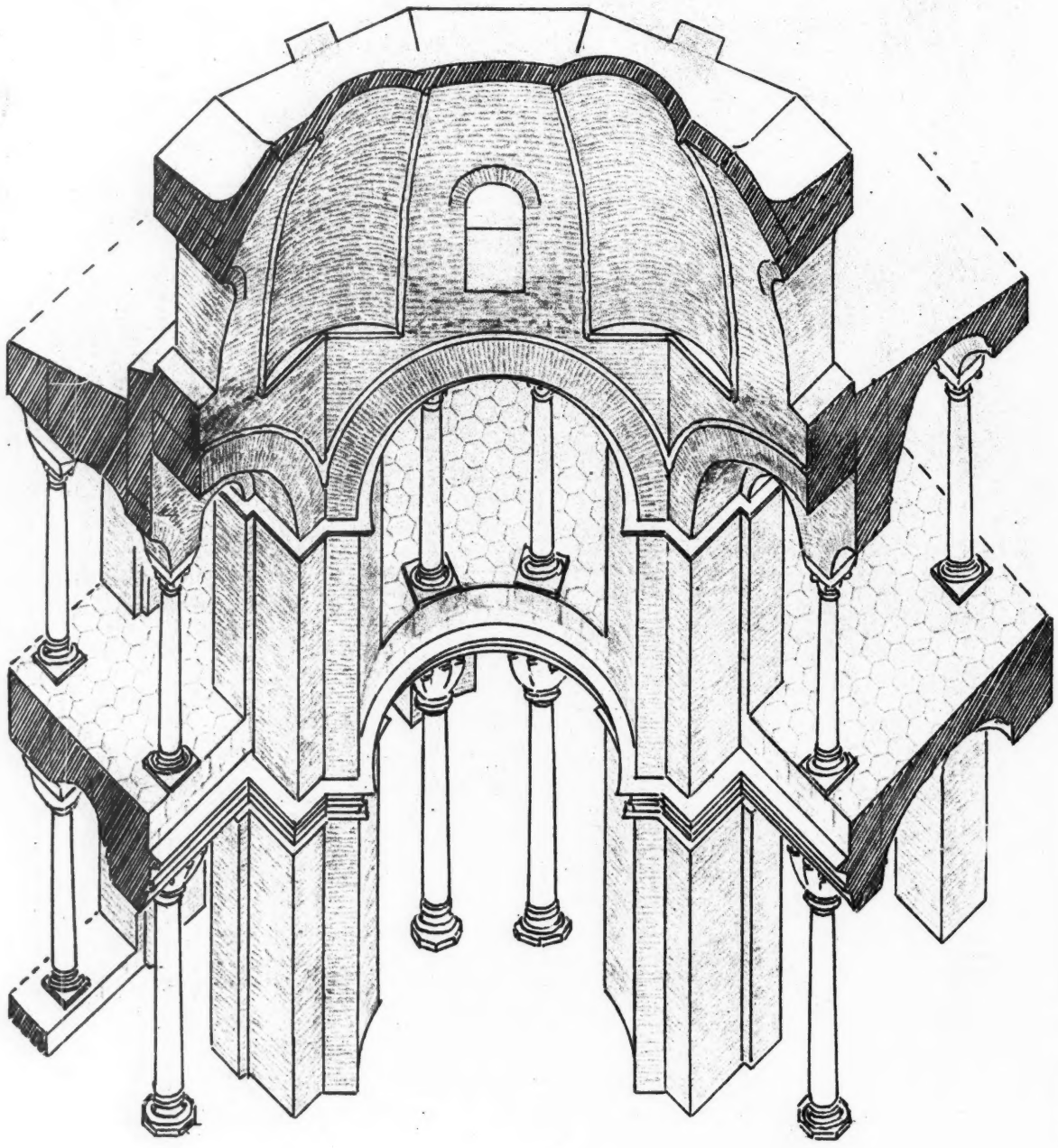
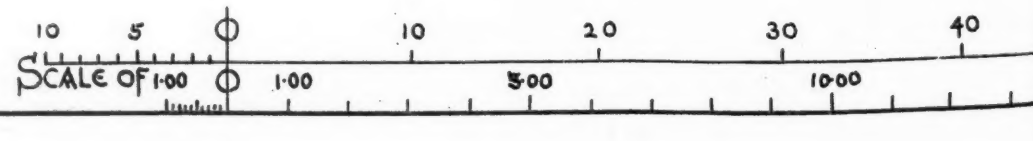
VIEWS OF OLD LONDON IN THE NEIGHBOURHOOD OF THE SAVOY AND CHARING CROSS.—PLATE II.

S.S.SERGIVS AND BACCHVS.



THE INTERIOR ARRANGEMENT
SHEWING GYNAECEVM FLOOR, VAVLTING, ROOF AND
SPRINGING OF DOME.

CONSTRVCTIVE SECTION OF THE



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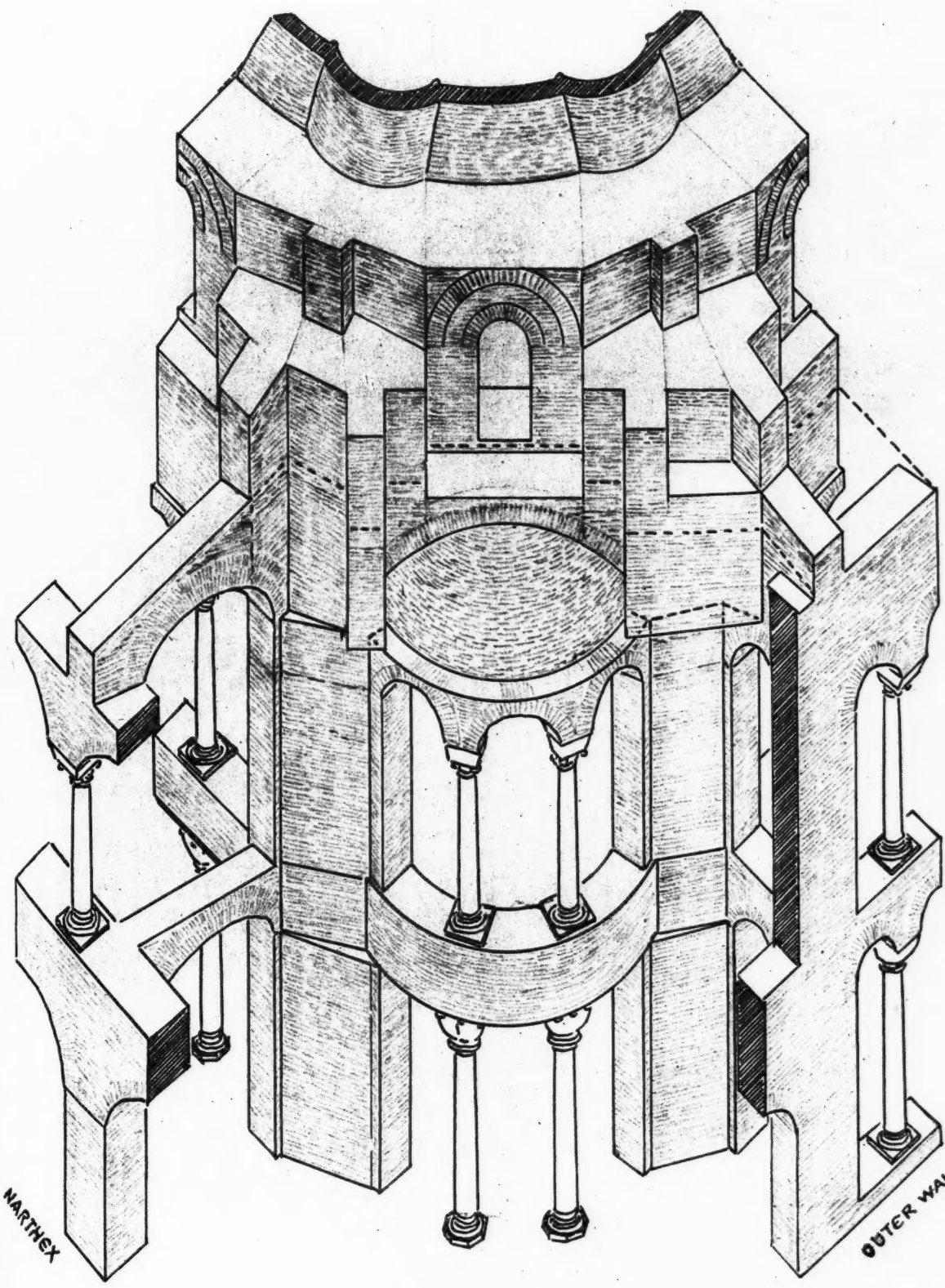

THE REAR – WITH GYNAECEVM FLOOR & ROOF REMOVED.

ECTION OF THE SOVTH-WEST EXEDRA.

40 50 60 70 80 90 100 FEET.

500 2000 2500 3000 METRES.

Measured and drawn by
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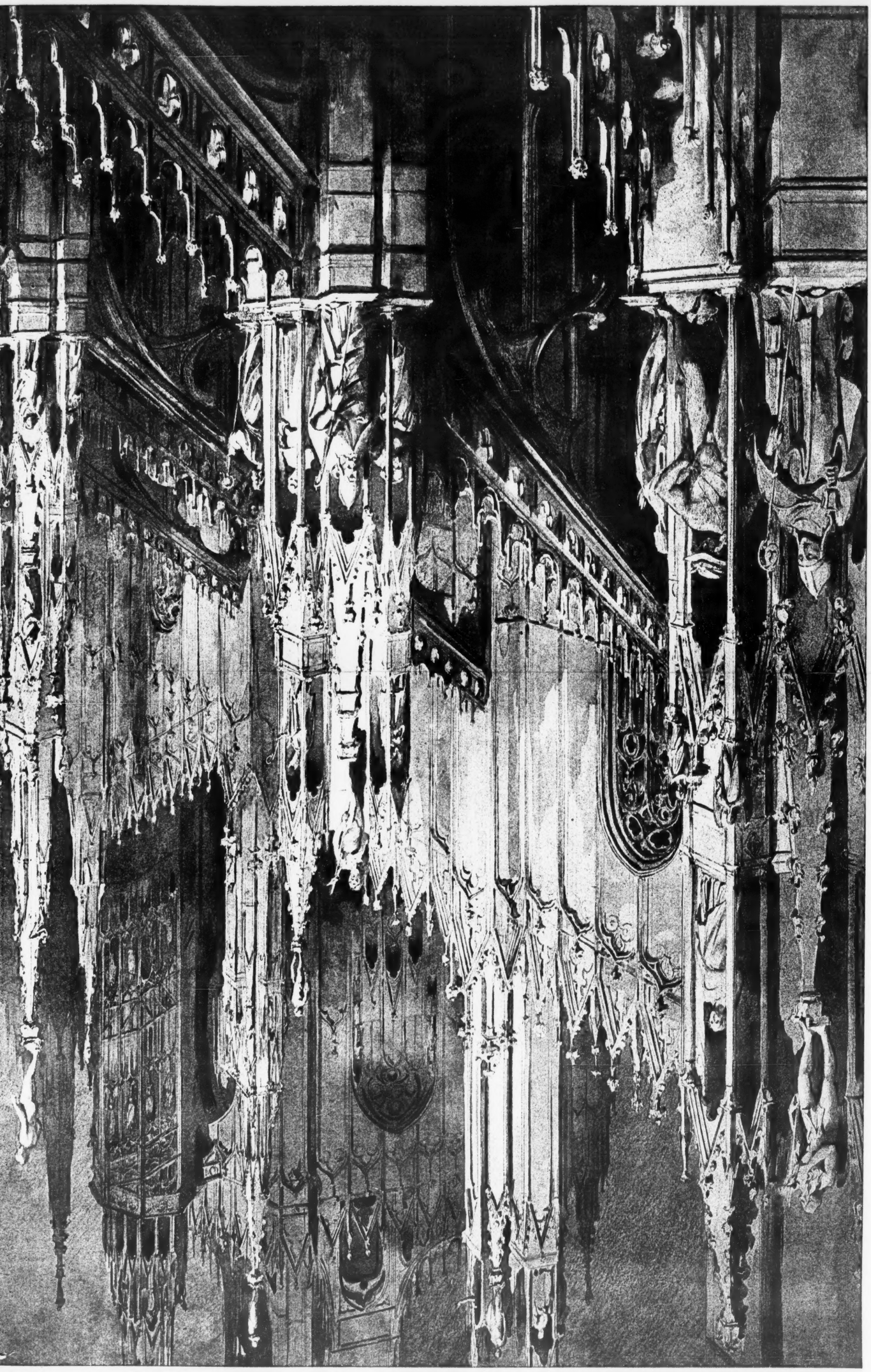
ROOF AT MILAN.—Drawn by Mr. A. C. Conrade.



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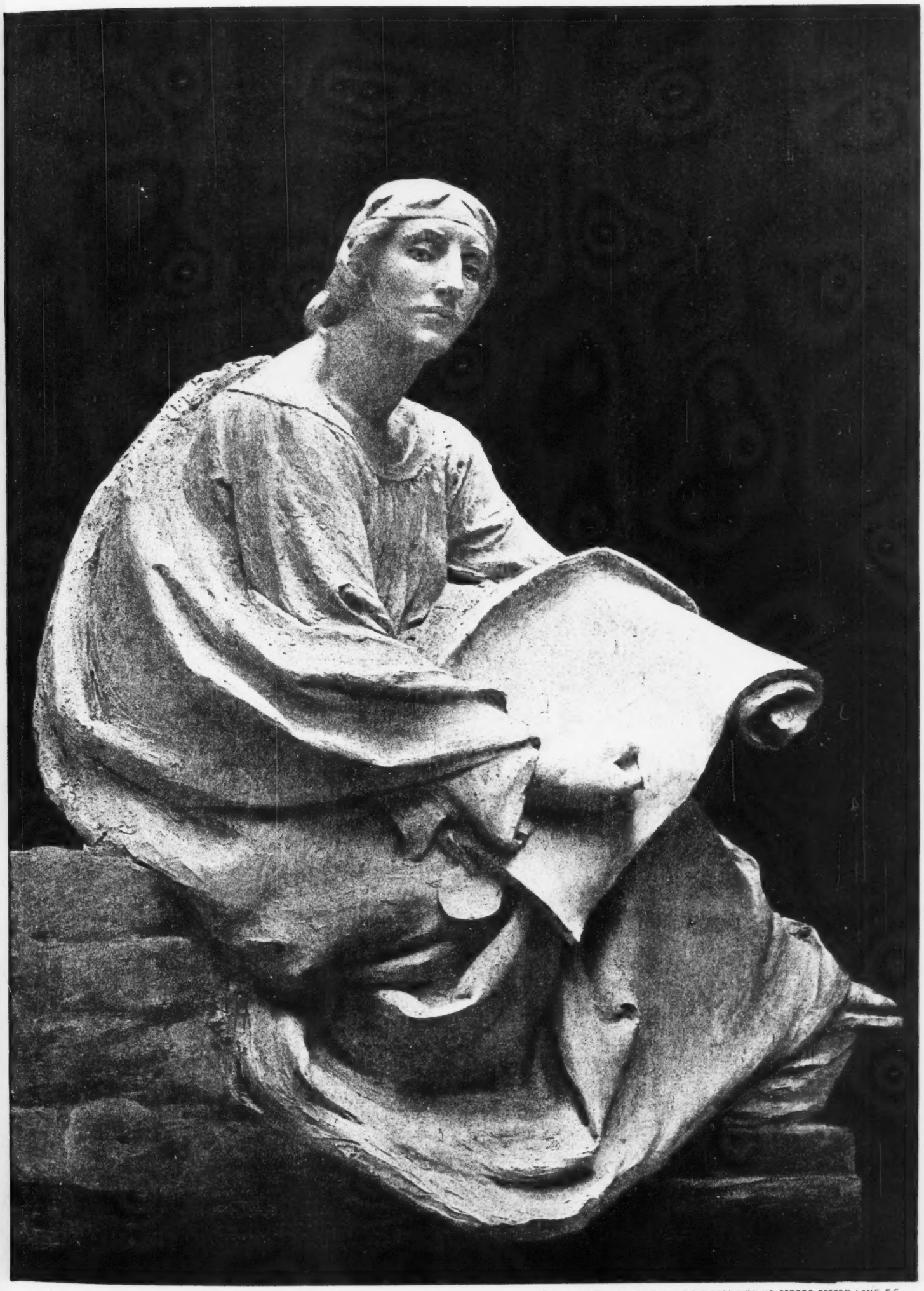

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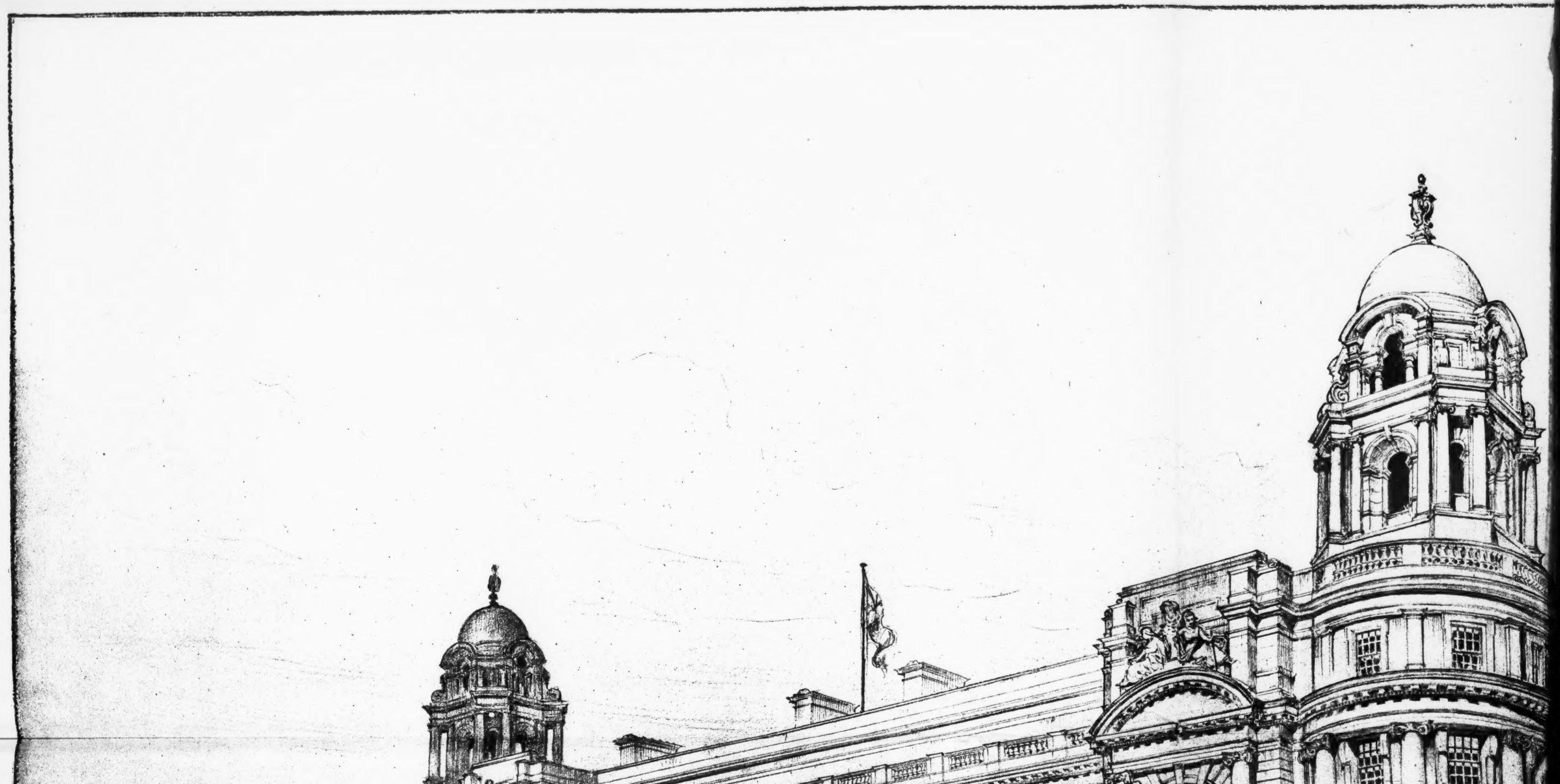

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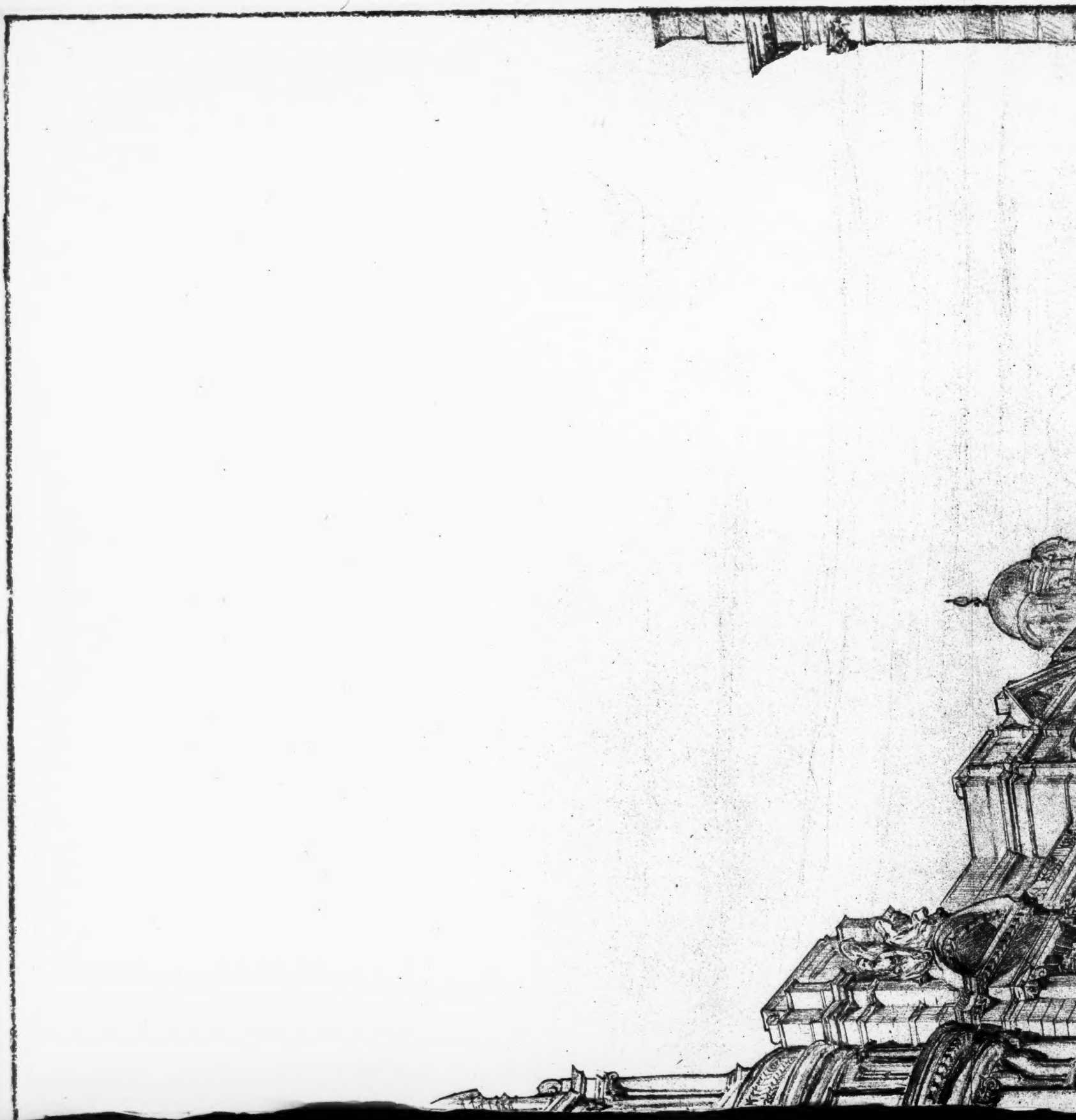

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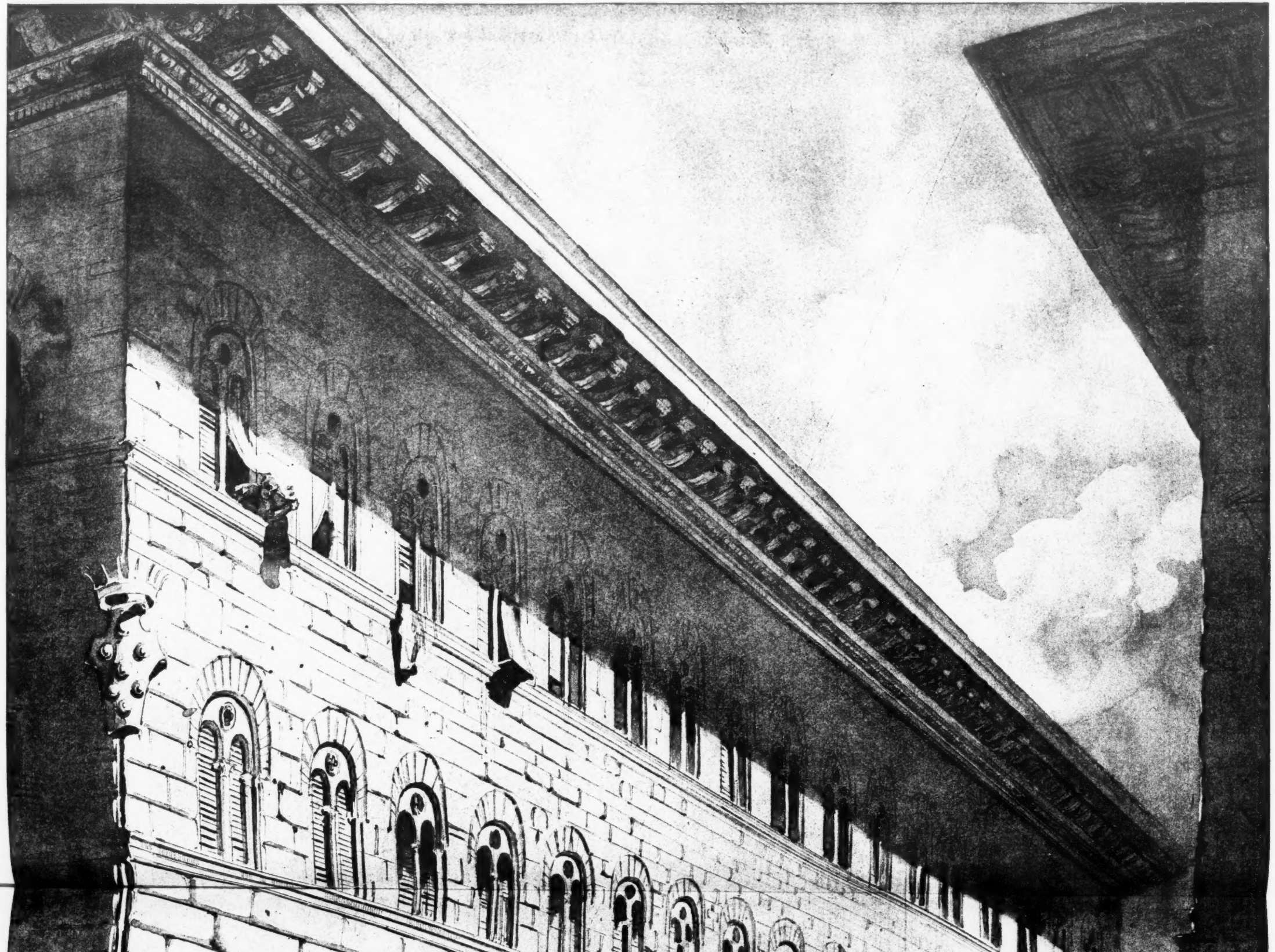

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RICCARDI PALACE, FLORENCE.—Drawn by Mr. A. C. Conrade.

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DE VILLE, VERSAILLES.—M. LE GRAND, ARCHITECT.
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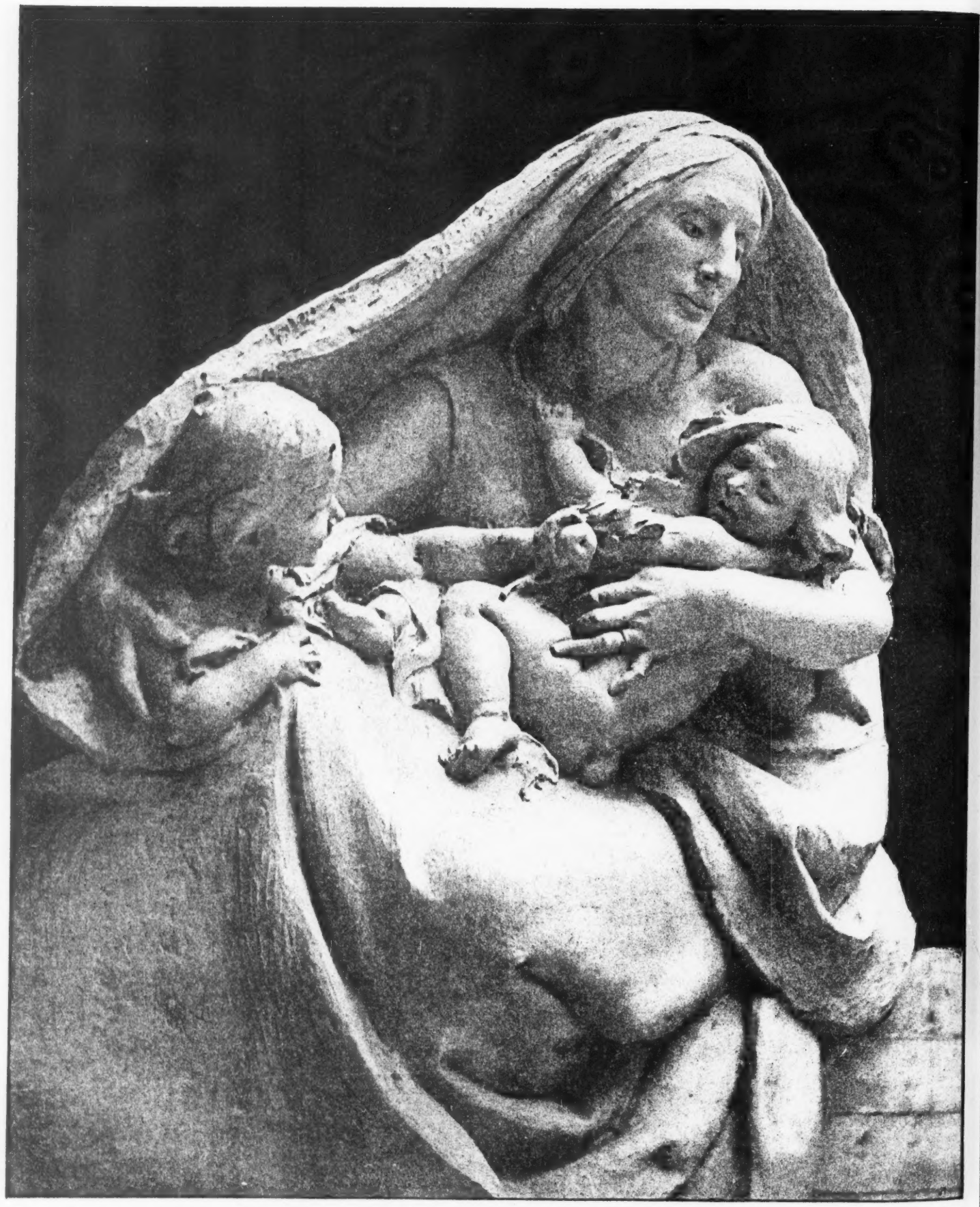

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SCULPTURE AT THE NEW WAR OFFICE.—Mr. Alf

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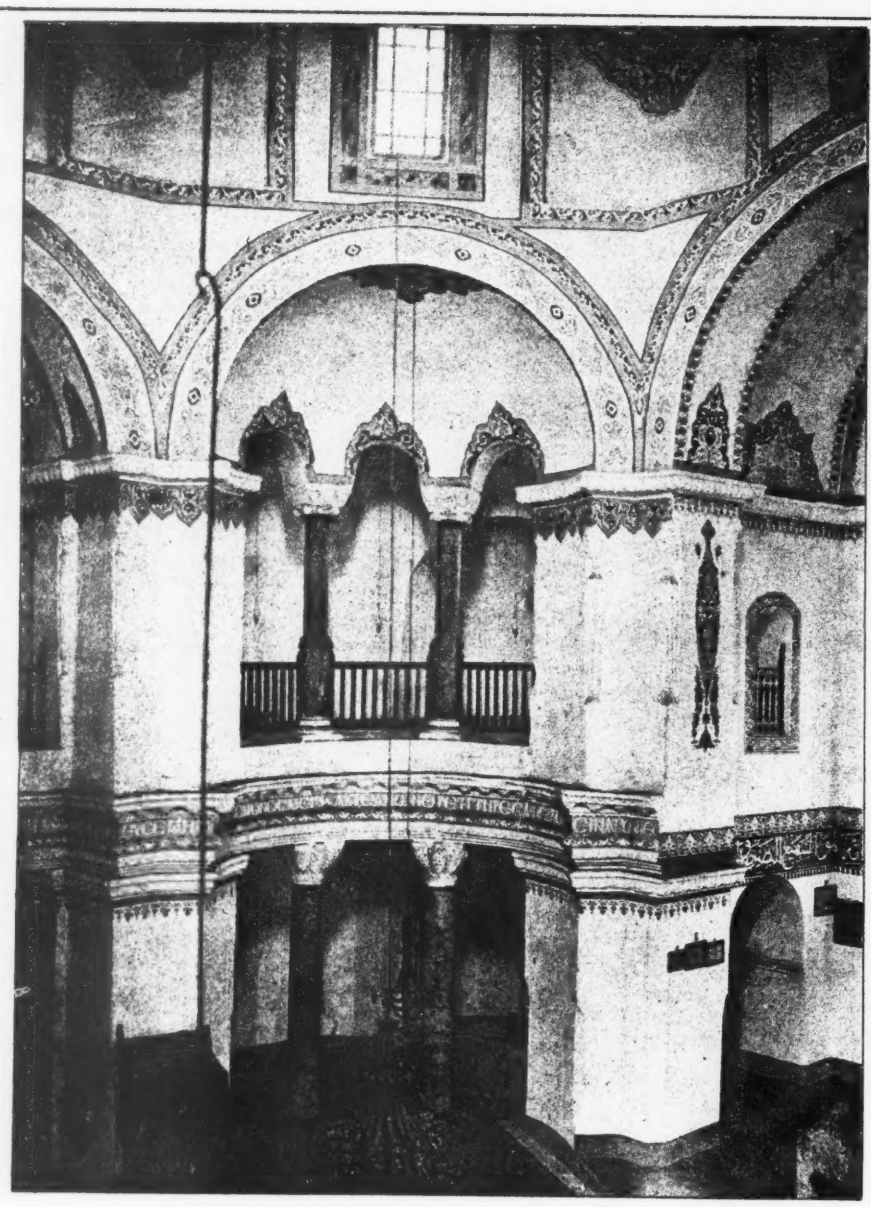
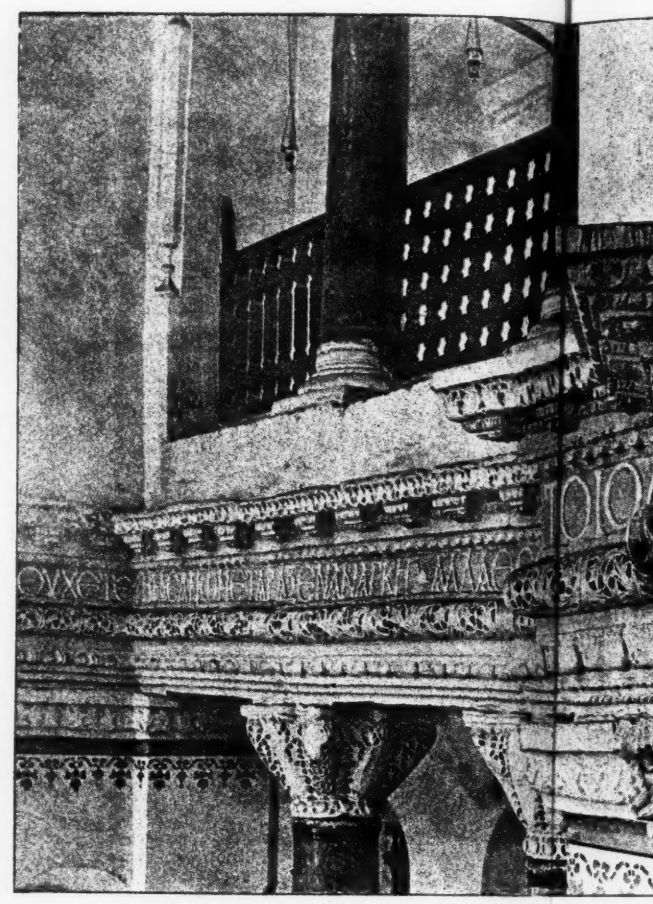
VAR OFFICE.—Mr. Alfred Drury, A.R.A., Sculptor

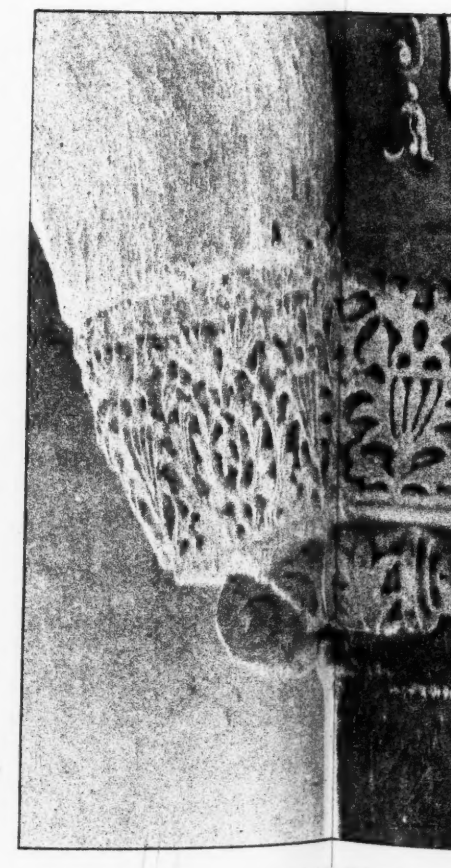


NORTH-EASTERN EXEDRA.



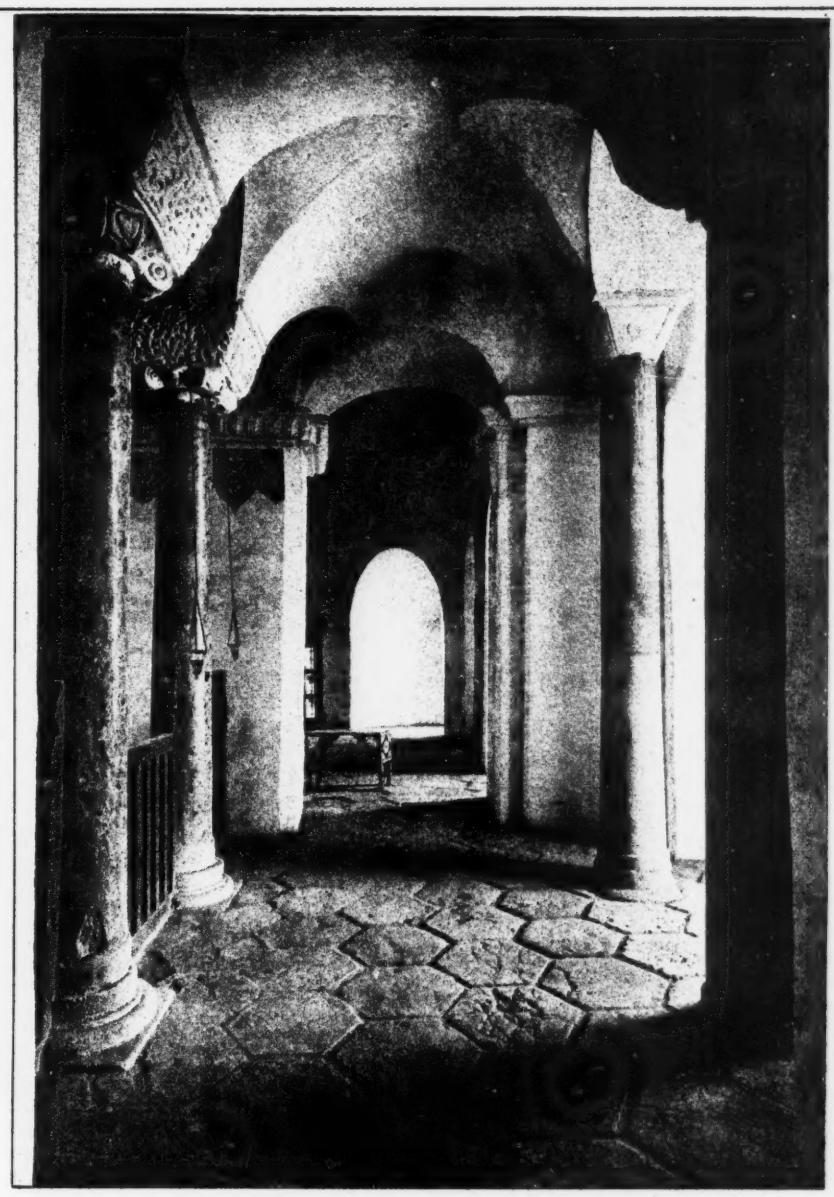
ENTABLATURE TO THE LOWER OR

CAPITALS CONNECTING UPPER NARTHEX WITH GYNÆCEUM.



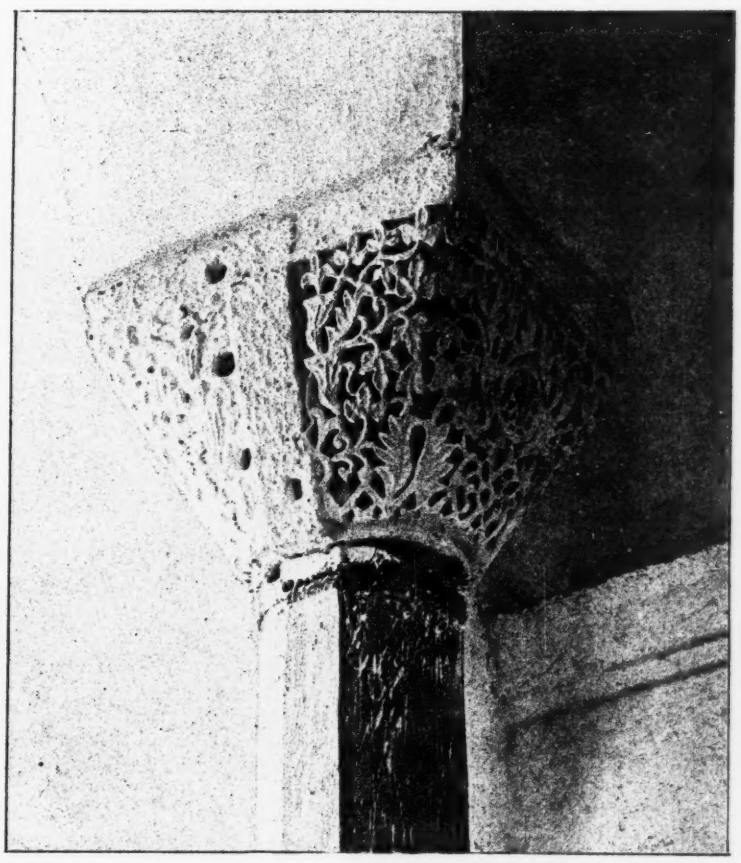
CAPITAL OF UPPER

RE TO THE LOWER ORDER, WESTERN BAY.



CENTRAL PORTION OF THE SOUTHERN GYNÆCEUM.

CAPITAL OF UPPER ORDER.



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BACCHUS: INTERIOR VIEWS AND DETAILS.

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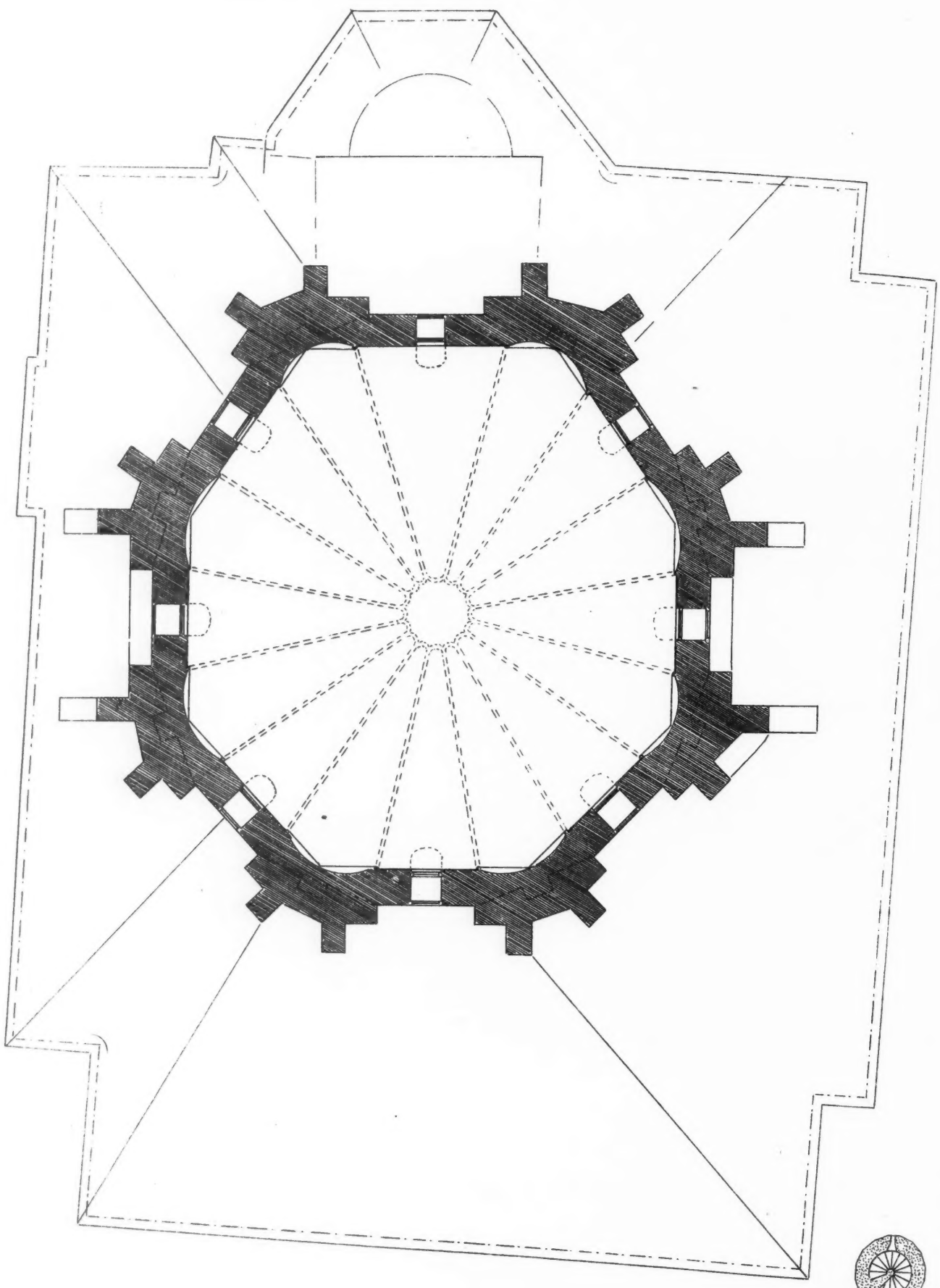
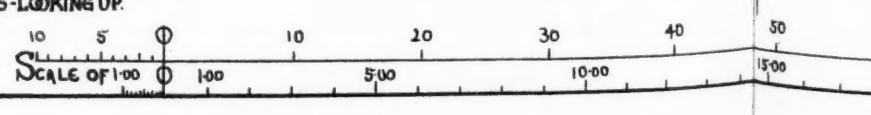
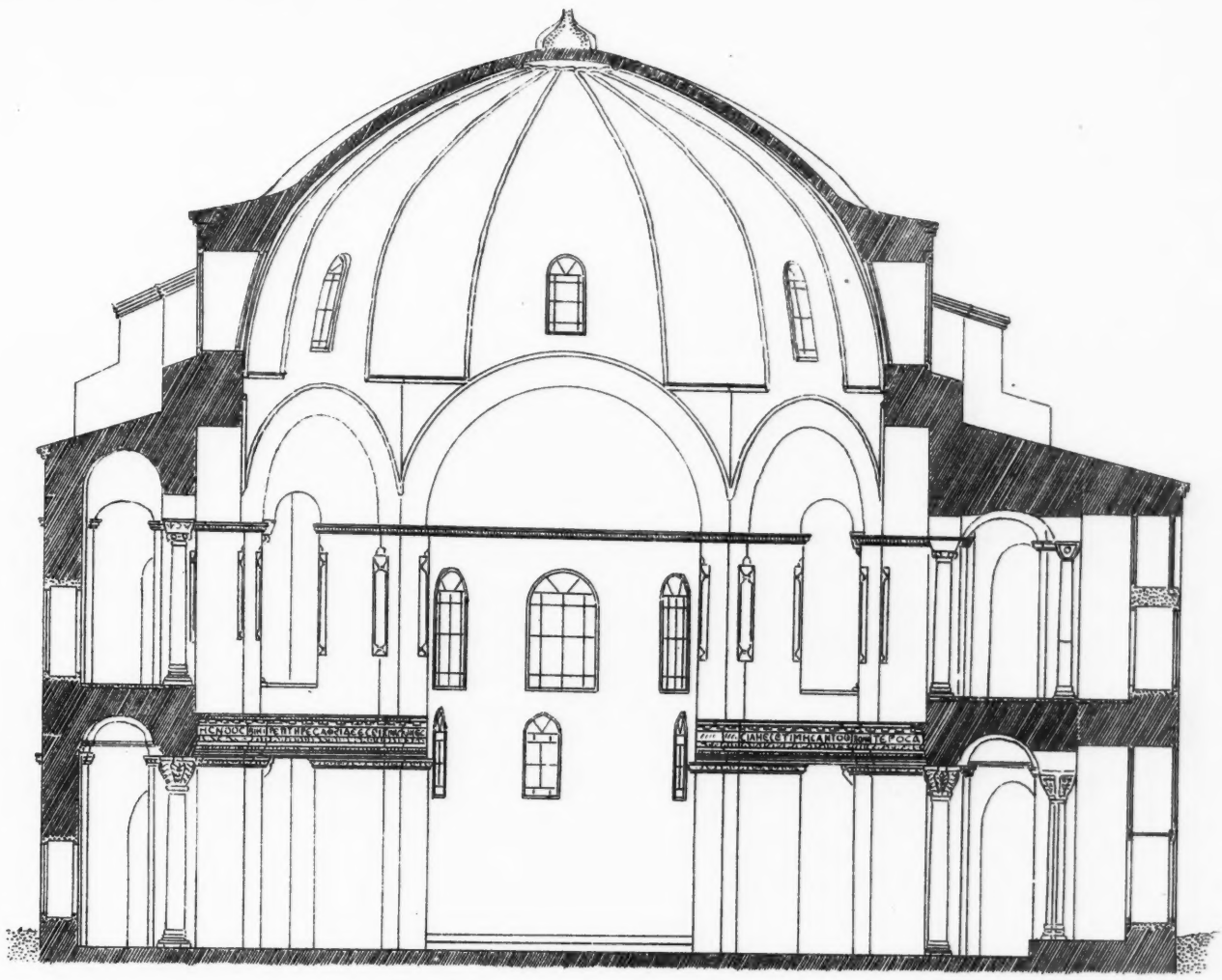


PLAN AT BASE OF DOME.

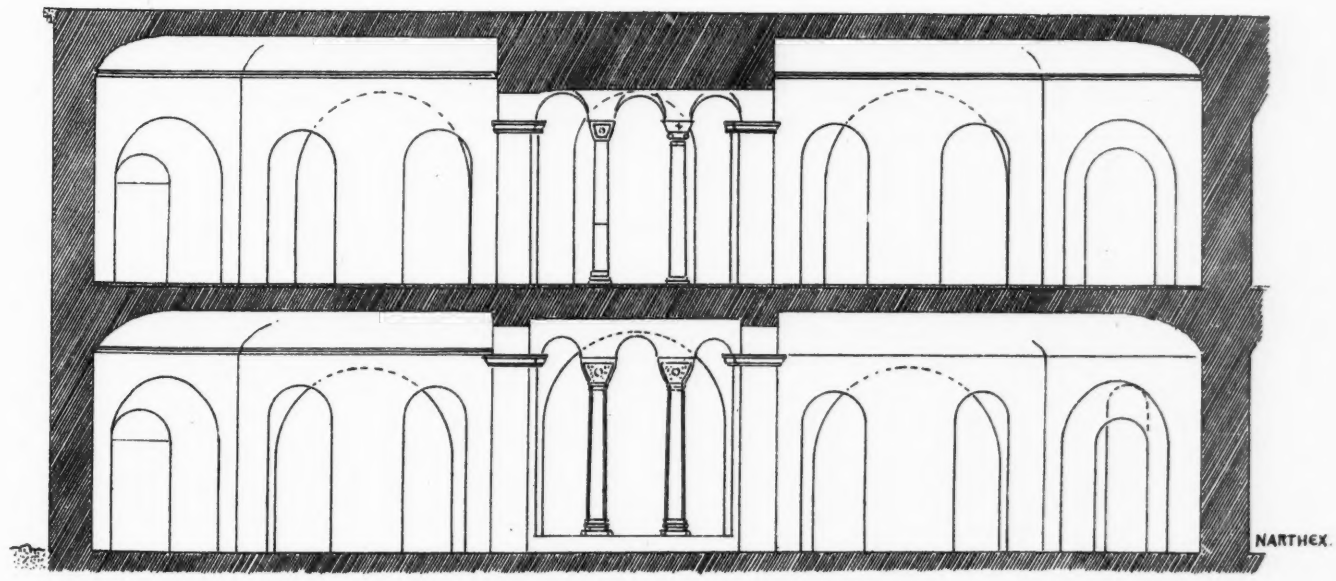
DOTTED LINES-LOOKING UP.



S.S.SERGIVS AND BACCHVS.



TRANSVERSE SECTION.



SECTION THROVGH SOVTH AISLE.

40 50 60 70 80 90 100 FEET
15·00 20·00 25·00 30·00 METRES

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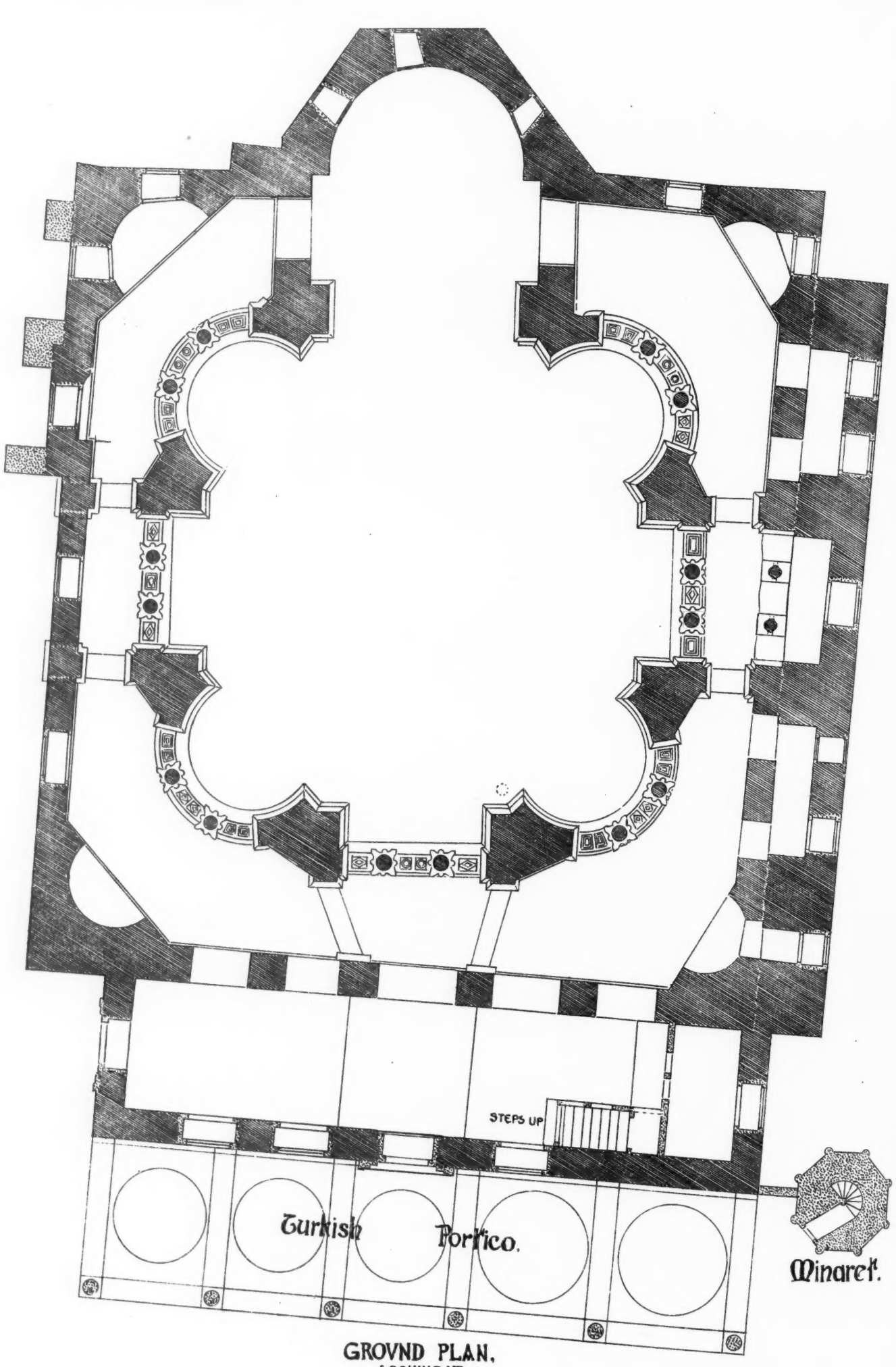
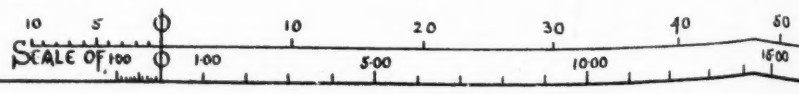


GROVND PLAN.
LOOKING VP.



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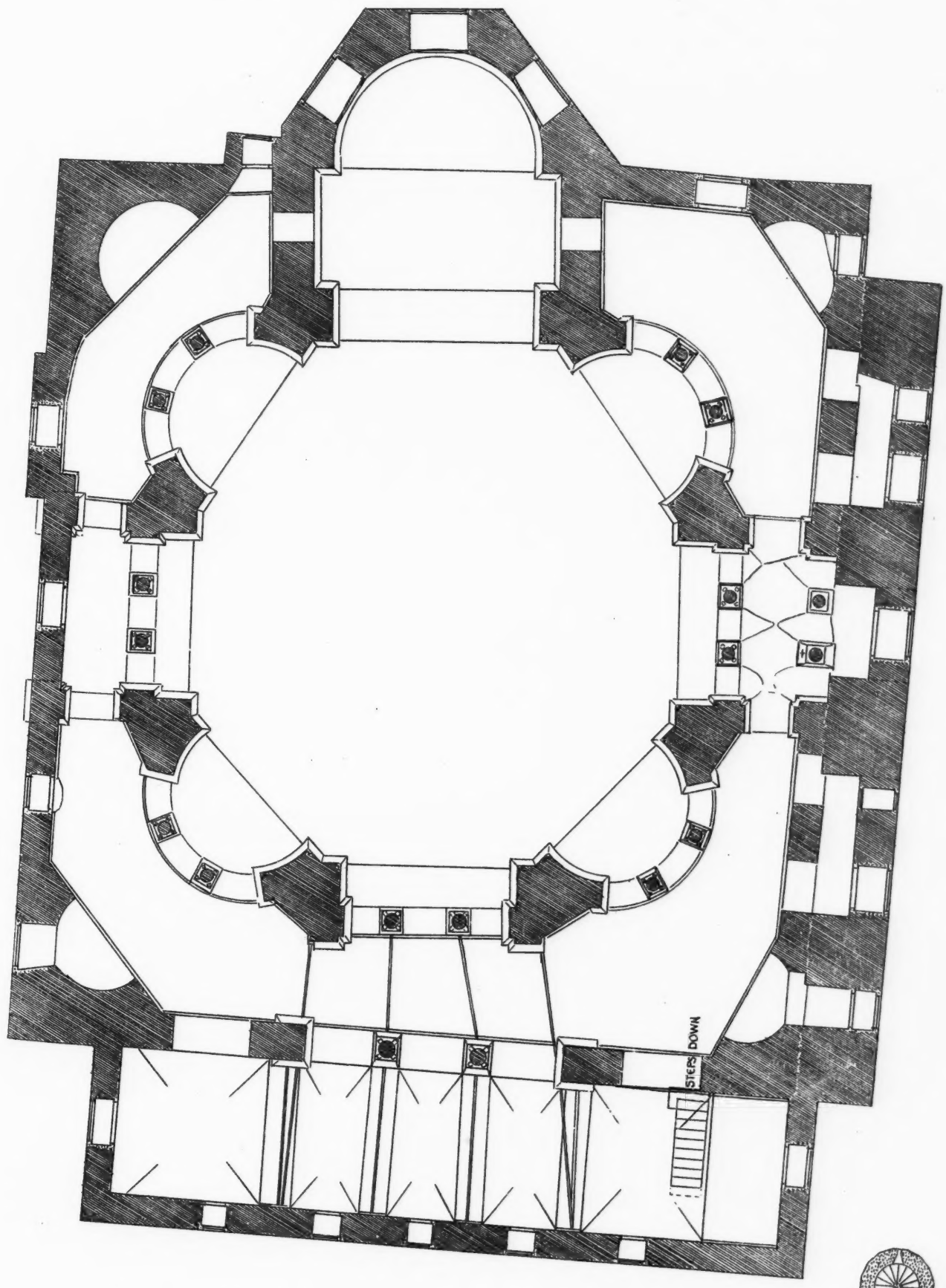
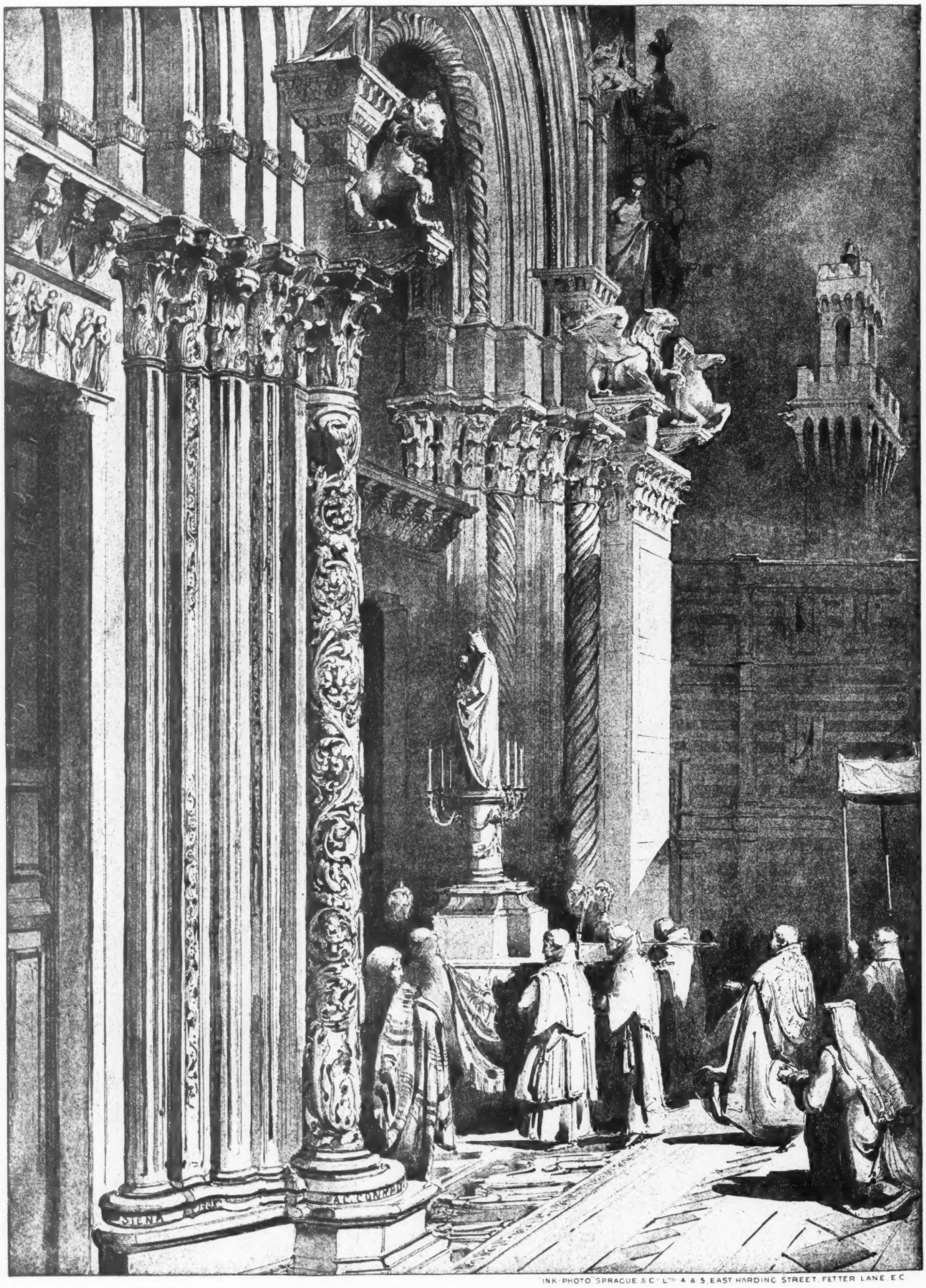


GYNAECEVM PLAN,
LOOKING VP.

40 50 60 70 80 90 100 FEET
1500 2000 2500 3000 METRES

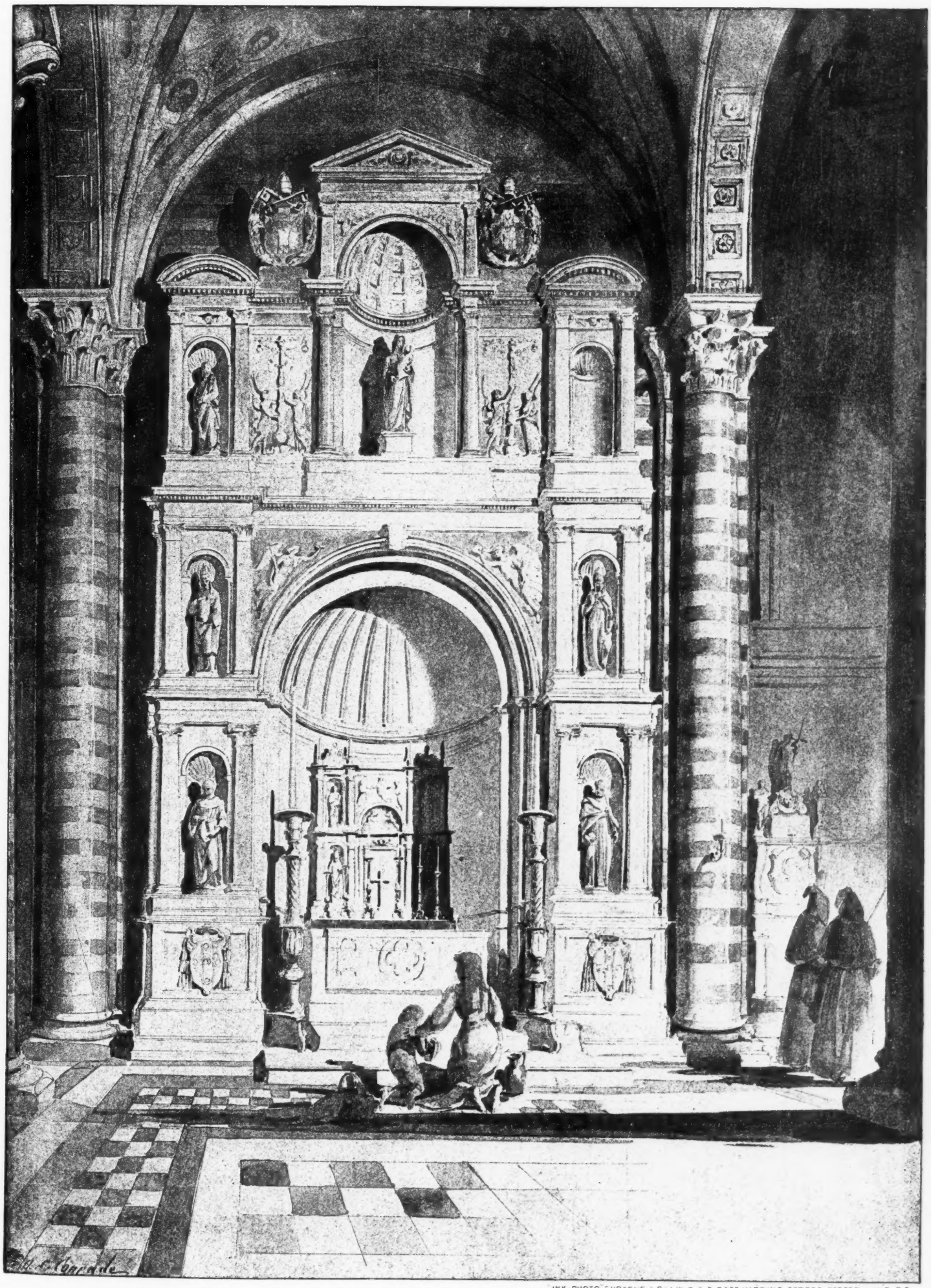
Measured and drawn by
Mr ARTHUR E. HENDERSON.

PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



INK-PHOTO SPRAGUE & C° L^TD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

PART OF FAÇADE, SIENA CATHEDRAL.—Drawn by Mr. A. C. Conrade.



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PICCOLOMINI ALTAR, SIENA CATHEDRAL.—Drawn by Mr. A. C. Conrade.